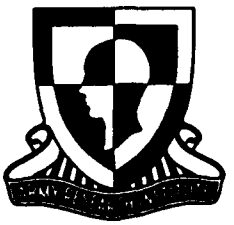

U.S. Army Research Institute
for the Behavioral and Social Sciences

Research Report 1615

Workload Assessment for the Combat Vehicle Command and Control Company-Level Evaluation

John C. Morey, Donald Wigginton, and
Lawrence H. O'Brien
Dynamics Research Corporation

April 1992

U.S. ARMY RESEARCH INSTITUTE
FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency Under the Jurisdiction of the Deputy Chief of Staff for Personnel

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REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	1992, April	Final Oct 89 - Jun 91

4. TITLE AND SUBTITLE
Workload Assessment for the Combat Vehicle Command and Control Company-Level Evaluation

5. FUNDING NUMBERS
DAHC35-89-D-0047
63007A
795
3101
C4

6. AUTHOR(S)
Morey, John C.; Wigginton, Donald; and O'Brien, Lawrence H.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Dynamics Research Corporation
60 Concord Street
Wilmington, MA 01887

8. PERFORMING ORGANIZATION REPORT NUMBER
E-17135U

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Army Research Institute for the Behavioral and Social Sciences
Fort Knox Field Unit
ATTN: PERI-IK
Fort Knox, KY 40121-5620

10. SPONSORING/MONITORING AGENCY REPORT NUMBER
ARI Research Report 1615

11. SUPPLEMENTARY NOTES
Contracting Officer's Representative, Kathleen Quinkert

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release;
distribution is unlimited.

12b. DISTRIBUTION CODE
--

13. ABSTRACT *(Maximum 200 words)*

This report describes the results of an operator workload assessment conducted to support research efforts on the Combat Vehicle Command and Control (CVCC) system. The CVCC is a set of selected futuristic components with functions that are simulated in the Close Combat Test Bed (CCTB) environment. Compared with the M1 Baseline, CVCC users reported no change or decrease in workload for more than 75% of the tasks surveyed. This report examines the CVCC workload results to support an early assessment of CVCC training requirements and discusses methods for workload assessment in advanced distributed simulators.

14. SUBJECT TERMS		15. NUMBER OF PAGES
Combat Vehicle Command and Control (CVCC) system	Command, control, communication (C3)	286
M1 Tank Workload Assessment	Close Combat Test Bed (CCTB)	16. PRICE CODE --

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	Unlimited

Research Report 1615

Workload Assessment for the Combat Vehicle Command and Control Company-Level Evaluation

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April 1992

Army Project Number
2Q263007A795

Training Simulation

FOREWORD

The U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) provides research, development, and applications support to ensure that soldier-related issues are considered in the weapon system acquisition process. The Future Battlefield Conditions team of the ARI Field Unit at Fort Knox, Kentucky, performs research on soldier performance and training issues by using simulation-based evaluations to investigate concepts and early training requirements analyses of future systems, such as those for command, control, and communications (C^3).

This evaluation was conducted under the Science and Technology task entitled "Training Requirements for the Future Integrated Battlefield." ARI's involvement in research on future battlefield conditions supports two Memoranda of Understanding. One, between ARI and the U.S. Army Armor Center and School, is on Research in Future Battlefield Conditions and was signed on 12 April 1989. The second, between ARI and the Tank Automotive Command, is on the Combat Vehicle Command and Control (CVCC) system and was signed on 22 March 1989.

ARI has briefed the CVCC research and development program to the Commanding General, U.S. Army Center and School, the U.S. Army Armor School's Directors of Combat Developments and Training and Doctrine, representatives from the Tank Automotive Command, Project Manager Training Devices, and the Training and Doctrine Command System Manager--Simulation Network.

CVCC is a functional configuration of futuristic combat vehicle command, control, and communications capabilities housed and evaluated in a simulation facility at Fort Knox. This report describes the assessment of operator workload associated with the CVCC. Tank commanders evaluated the CVCC in offensive and defensive operations conducted in CVCC-configured M1 simulators of the Close Combat Test Bed. For more than 75% of the tasks surveyed, CVCC users reported no change or reduction in workload compared with the conventional M1 baseline. These and other workload findings are reported, together with insights on workload assessment techniques effective in CCTB. This evaluation demonstrates the continuing contributions that advance distributed processing simulations make to early developmental investigations of new system concepts.

EDGAR M. JOHNSON
Technical Director

WORKLOAD ASSESSMENT FOR THE COMBAT VEHICLE COMMAND AND CONTROL COMPANY-LEVEL EVALUATION

EXECUTIVE SUMMARY

Requirement:

This report provides the workload assessment results of an evaluation of the Combat Vehicle Command and Control (CVCC) system, a functional configuration of futuristic command, control, and communications capabilities for combat vehicles.

Procedure:

Tank crews consisting of a tank commander (TC), driver, and gunner conducted combat missions in Close Combat Test Bed (CCTB) M1 tank simulators. The experimental group's simulators were equipped with the CVCC. The baseline group manned conventional M1 simulators. All crews were familiarized with the CCTB, performed practice exercises, and received instruction in completing the workload assessment instrument; TCs assigned to the CVCC condition received additional training on CVCC operation. Two 3-hour, company-level scenarios, one defensive and one offensive, were conducted with seven manned simulators. The semiautomated forces of CCTB rounded out the friendly forces company with six tanks and provided the opposing enemy forces.

The workload assessment instrument used the six NASA-TLX (Task Load Index) scales to obtain subjective workload ratings. The instrument provided a task list from which TCs selected and then rated for workload tasks performed during specified events in the scenario. Seventeen of the tasks from this list were designated as global tasks. TCs provided an additional set of workload ratings for these tasks. Workload assessment took place at the completion of the offensive and defensive scenarios.

Findings:

Workload for 10 of the 17 global tasks was not significantly different for CVCC users compared with M1 baseline users or for various TC duty positions. The seven tasks showing increases or decreases in workload are identified in the following paragraphs. Scenarios did not result in workload difference for any of the 17 tasks.

Compared with the M1 baseline, users of the CVCC reported significantly higher workload for preparing and sending three types of reports: spot, contact, and call for fire. Workload increases were associated with increased effort, frustration, and time demand in using the CVCC. Workload did not vary as a function of duty position for these tasks.

For two navigation tasks--determine location and monitor/correct route progress--the CVCC resulted in lower workload compared with the M1. Workload savings were attributed primarily to a decrease in mental demand and time demand, respectively. A related task--direct a scheme of maneuver--revealed higher workload for company commanders using the CVCC. Platoon leaders did not demonstrate a significant difference in workload between the CVCC and M1 baseline.

Only one task related target acquisition and firing revealed significant workload differences. These differences were associated with duty position and not with the use of the CVCC. Company commanders rated their workload for coordinating sector searches lower than other TCs in the company, none of whom differed significantly in their perceived workload.

The global task rating approach was found to be more effective in assessing workload differences than the event-based approach. Transformation of workload ratings to deviation scores and the analysis of workload differences using the diagnostic capability of the NASA-TLX scales were useful analytical tools for CCTB workload evaluation.

Utilization of Findings:

During the early concept evaluation of the CVCC system, operator workload associated with a functional configuration of the CVCC was evaluated in CCTB. Using these data, together with system and unit performance measures, training developers can identify potentially problematic tasks associated with futuristic equipment. In addition, commanders, program executives, and combat developers can identify system design or utilization for this new system concept. This effort also provides methodological contributions for assessing operator workload in advanced distributed processing simulators.

WORKLOAD ASSESSMENT FOR THE COMBAT VEHICLE COMMAND AND CONTROL COMPANY-LEVEL EVALUATION

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WORKLOAD ASSESSMENT FOR THE COMBAT VEHICLE COMMAND AND CONTROL COMPANY-LEVEL EVALUATION

Introduction

Future combat vehicles are likely to include improvements in the integration of information, navigation, and fire control subsystems. These improvements will be achieved by providing the vehicle commander with an integrated workstation from which he can monitor, direct, and control all vehicle subsystems. From this workstation the commander can initialize and test subsystems, access and update his crew's subordinate displays and controls, monitor the location and orientation of his vehicle and primary weapon system on the battlefield, and manage combat event information. The ability of the commander to control the content and flow of information and to exercise his span of control more effectively is essential for higher level integration across combat systems.

This integrated workstation would provide the commander with a technological tool for directing his vehicle and crew and perhaps for influencing the actions of other crews as well. However, by automating some functions and introducing new capabilities for information processing, the technology changes how the commander performs command and control. Relieved of some requirements to interact directly with crew members or to physically control vehicle actions, the commander becomes more a monitor of events and manager of information. This shift raises the question of whether the form and function of the technology is correctly matched to the skills and aptitudes of the operator.

The U.S. Army Research Institute at Fort Knox is investigating this and other functional design and operational effectiveness issues related to future combat vehicle command, control, and communication (C^3) system concepts. Through the use of soldier-in-the-loop simulation, functional representations of C^3 technologies are being used to evaluate system features before concepts are finalized. This research is aimed at evaluating the operational effectiveness of alternative systems, assessing related soldier-machine interface issues and identifying preliminary training requirements associated with the systems.

One important advantage of examining system functions in simulation is that the operator's mental workload can be assessed together with other soldier performance and operational effectiveness issues. Workload assessment is one means of determining the potential mismatch between high technology C^3 systems and operator skills. For example, in a survey of commercial airline pilots conducted by Curry (cited in Kantowitz & Casper, 1988), 79 percent of the pilots agreed that they use automation devices because they are useful. However, 36 percent disagreed that automation reduces overall workload. A number of researchers have described the negative workload impacts that often are associated with the introduction of automated aids for complex operator workstations (e.g., Colle, Amell, Ewry & Jenkins, 1988; Weirwille, Rahimi, & Casali, 1985).

This report describes workload assessment of functional prototypes of C^3 systems being considered for implementation on future battlefield armor systems. An evaluation of the systems was conducted on the Close Combat Test Bed (CCTB), formerly referred to as SIMNET-D, a specialized facility of reconfigurable simulators located at Fort Knox, Kentucky. CCTB provides a capability to experimentally manipulate combat vehicle designs, doctrine, tactics, or training, and observe impacts on key soldier performance measures. CCTB is particularly useful for command and control investigations, since the computer-based control of the simulations provides a convenient interface with the command and control information collection and management functions.

Workload assessment was one part of the overall evaluation of the C^3 systems. The complete evaluation examined the impact of the systems on unit performance, device function utilization, and user acceptance. Descriptions of these aspects of the evaluations are provided in a research report by Leibrecht et al. (in preparation). The present report focuses on the subjective ratings of workload by the company commanders, platoon leaders, and other tank commanders participating in the evaluation.

The following sections describe the general features of CCTB, the two command and control configurations evaluated, the workload assessment approach adopted for this experiment, and the specific objectives of the workload assessment.

Background

CCTB Description

CCTB is a key component of the U.S. Army's growing inventory of man-in-the-loop simulators. Originally developed under a program to implement advances in distributed processing and computer networking, CCTB is a research and development facility that permits rapid modifications to crew station hardware and software. Important features and characteristics of CCTB are summarized below. Detailed descriptions of CCTB are available in Dubois and Smith (1989), Garvey and Radgowski (1988) and Perceptronics (1987).

A single enclosure contains workstations for the four man M1 tank crew -- tank commander, gunner, driver and loader. The layout of the crew compartment resembles that of an M1 tank. Controls and indicators replicate those of the actual equipment, and non-critical controls and functions are represented in full-scale figures. Vision blocks and optical systems such as sights permit the crew to view a computer-generated image of the battlefield. Radio communication capabilities also are available. For this evaluation, Single Channel Ground and Airborne Radio Sub-system-VHF (SINCGARS) functions were implemented.

The individual tank simulators are interconnected across a common network that permits the exchange of continuously changing vehicle (e.g., speed, current location) and combat event information (e.g, ballistic impacts, resupply operations). Each simulator shares the same terrain data base, which in this evaluation was a 75 km square area of Fort Knox, Kentucky. The on-board computer continuously updates and repaints the different views of the battlefield available through vision blocks and sighting systems. These views include terrain features, friendly and enemy tactical vehicles, and weapons effects (e.g., explosions, dust clouds).

Integrated force-on-force combat is achieved by providing each simulator crew the ability to operate independently and engage the enemy in its combat area. This permits commanders to conduct tactical operations, such as fire and maneuver, on the simulated battlefield. The tank commanders of each simulator exercise command and control as they would in actual tanks. A semi-automated opposing force (OPFOR) employs enemy tanks,

infantry fighting vehicles, aircraft, and support vehicles on the battlefield. In simulated battles with the enemy, commander and crew skill determine the tank's effectiveness and vulnerability.

Command, Control and Communication Systems

Two C^3 system configurations were evaluated on CCTB during this evaluation: the Intra-Vehicular Command and Control (IVCC) system and the Combat Vehicle Command and Control (CVCC) system. The CVCC was designed to represent more advanced and futuristic technology. It contains improvements to a number of the functional capabilities provided by IVCC and adds several important new functional capabilities including the capacity to communicate with similar systems in other vehicles. A detailed description of the CVCC system is provided in Leibrecht et al. (in preparation). Table 1 summarizes the major differentiating features of each system. The baseline system was the M1 simulator.

The CVCC configuration represents an advanced concept for the functional integration of three subsystems -- the InterVehicular Information System (IVIS), the Position Navigation System (POSNAV), and the Commander's Independent Thermal Viewer (CITV). Earlier research on the IVIS (DuBois, 1990), POSNAV (DuBois & Smith, 1989) and the CITV (Quinkert, 1987) resulted in specific guidance on the functions, capabilities, and operational characteristics necessary for effective use of these subsystems. The prototypes employed in this research incorporated this guidance.

The IVIS and POSNAV are separate capabilities controlled and operated by the tank commander (TC) on a single control panel and display called the Command and Control Display (CCD). The CCD, situated at eye level to the front right of the TC, is divided into four areas: (a) a map display, (b) dedicated menu keys, (c) an "own location" area, and (d) an information display area. In the center of the map display is an icon of the commander's own tank. The tank's location is continuously updated by POSNAV and displayed on the CCD. As the tank moves, the map scrolls to coincide with the change in location. The dedicated menu keys call up variable menus and templates for (a) various types of combat reports (e.g., contact, call for fire, logistics) completed by selecting listed items (b) map functions and (c) route planning. Time, date, and location information is automatically added to the reports. The map display may contain icons of other friendly or

Table 1

Comparison of Features of the CVCC and IVCC Systems

Duty Position	Device	CVCC	IVCC
Tank Commander	CCD	Create, send, and receive, critical battlefield reports	Create critical battlefield reports
		Receive, display, and relay Fragmentary Orders (FRAGOs) and tactical overlays	
		See his vehicle location and heading	See his vehicle location and heading
		See the locations and headings of other friendly vehicles	
		Display digital terrain features on the tactical map	
		Save copies of all reports, FRAGOs, and routes created, received or sent	Save copies of all reports and routes created
		See the orientation of his main gun and CITV	See the orientation of his main gun and CITV
	POSNAV	Create, send , and receive route information (i.e. waypoints)	Create routes
		Pass critical navigation information to the driver	Pass critical navigation on information to the driver
	CITV	Scan the battlefield and acquire targets	Scan the battlefield and acquire targets
		See thermal images as white hot or black hot	See thermal images as white hot or black hot
		Change from a 3X to 10X sight	Change from a 3X to 10X sight
		See what appears in the gunner's sight	See what appears in the gunner's sight
		Set a sector for auto scan	Set a sector for auto scan
		Immediately designate critical enemy targets	Immediately designate critical enemy targets
		Stack up to 4 enemy targets in a target queue	
		Identify targets as friend or foe (IFF)	
Driver	POSNAV	Use the Steer-to display to get to the next waypoint	Use the Steer-to display to get to the next waypoint
		Read the distance to the selected waypoint	Read the distance to the selected waypoint
Gunner	CITV	Select targets from the target queue	

Other Features	CVCC	IVCC
	The CCD is in color	The CCD is black and amber
	The CCD tactical map can show selected terrain features	The CCD tactical map does not show terrain features
	The cursor control on the commander's control handle OR the touch screen can be used to operate the CCD	The cursor control on the commander's control handle must be used to operate the CCD
	The CITV target stack and identification friend or foe (IFF) system are operational	

From CCTB Combat Vehicle Command and Control (CVCC): Draft Users Guide, by Paul G. Smith, August, 1990, Cambridge, MA: Bolt Beranek and Newman, Inc.

enemy vehicles. Information entered on the CCD can be stored and retrieved.

The route planning function of POSNAV allows the TC to plot a series of waypoints on the map display. These waypoints can be stored and communicated to the tank driver in the form of a steer-to display. This display provides the driver a distance reading from the present location to the next waypoint, together with an indicator of deviation from the intended course.

The CITV, situated to the immediate left of the CCD, is a infrared target acquisition and surveillance system for dedicated use by the TC. The system permits the TC to view the battlefield on a display screen independent of the Gunner's Primary Sight (GPS) in either an automatic or manual scan mode. The same low (3X) and high (10X) power magnifications, and black hot-white hot image contrasts available on the GPS are found on the CITV. A target designate feature permits the TC to slew the turret and GPS to coincide with the CITV line of sight for target hand-off to the gunner.

The CVCC configuration of IVIS, POSNAV and CITV automates some tasks for the TC (such as sending reports digitally through SINCGARS), provides more complete information (e.g., a map with terrain features, other tank locations) and provides more functions (e.g., a capacity for storing target locations called target stacking) than the IVCC configuration. The IVCC lacks a number of the CVCC features, most importantly the capacity to send and receive digital messages such as reports and positions. Tables 1 and A-1 of this report, and a task analysis of these systems (Wigginton & O'Brien, in preparation) contain more detailed descriptions of the potential impacts of CVCC and IVCC design features on task performance.

Workload Assessment

The Concept and Definition of Workload

As several researchers have noted, there is no universally accepted definition of workload (e.g., Kantowitz & Casper, 1988; Moray, 1982). Definitions have been offered that describe workload in terms of attention (Jex, 1988), information processing (Gopher and Donchin, 1986) and multiple resource allocation (Wickens,

1984). The wide variety of workload definitions are associated more with justifying particular methods for assessing workload than with describing well-developed theoretical models of workload (Lysaght et al., 1989). In general, definitions of workload involve the following components of the workload concept:

1. The capacity of the operator of a system to perform tasks

2. The limitation of time available to perform tasks, and

3. The psychological experiences of the operator while performing tasks

These components draw together conceptually the interrelated influences of the external situation (i.e., task difficulty and time demands) and the operator's individual capabilities (e.g., perceptual, cognitive, physiological resources) for responding to situational demands. Workload may be defined as the operator's experience of a discrepancy between demands to perform and his or her capacity to meet these demands.

The importance of the concept of workload (frequently referred to as mental workload) is that it highlights operator capabilities and the allocation of these capabilities as determinants of performance. Under moderate levels of workload, increased demands on an operator may be met with no observable performance changes. However, with further increases in workload, the capacity of the operator to continue performing at satisfactory levels or to meet new demands (e.g., perform another task concurrently) may be impaired. Workload assessment identifies this potential impairment. The assessment of workload may also provide clues to the sources of the impairment. Therefore, under conditions of both satisfactory and impaired performance, workload assessment may provide useful information about the ability of the operator to successfully complete the tasks comprising a mission.

A practical rather than a theoretical position on workload guided our review of the existing methods of workload assessment for the current CCTB application. The focus on practicality prompted the requirement that efficient means be used to assess workload in CCTB. Since the purpose of this research was not to test the implications of a workload theory, a broad range of techniques was open for evaluation.

Criteria for selecting a workload assessment approach are considered first. This is followed by a review of the major classes of current workload assessment techniques. This section on workload assessment concludes by identifying the specific assessment techniques selected for this C^3 system evaluation.

Criteria for Workload Assessment Techniques

O'Donnell and Eggemeier (1986) list five criteria for selection of workload assessment techniques for a particular application. These are:

1. Sensitivity - the capability of a technique to detect changes in the levels of workload imposed by task demands.

2. Diagnosticity - the capability of a technique to identify the source of the workload imposed on the operator, e.g., different types of capacity or resources.

3. Intrusiveness - the tendency of the technique to degrade ongoing primary task performance or to interfere with an operator's performance of the task.

4. Implementation - factors related to ease of implementation of a workload instrument.

5. Acceptance - the degree of the operator's ability and willingness to utilize the technique.

Ideally, a technique should meet all of these criteria. In actuality, techniques meet some of these criteria or optimize a few (O'Donnell & Eggemeier, 1986; Wickens, 1984). The CCTB environment would require particular attention to the final three criteria. Because the exercise scenarios that are typically examined in CCTB can not be interrupted for workload assessment, techniques considered intrusive had to be avoided. In addition, since operators are under a tight training, performance, and evaluation schedule, ease of implementation and acceptance needed to be maximized. Thus, we selected a workload method in a two-step process. First, we identified methods that could meet the intrusiveness, implementation, and acceptance constraints. From these methods, we selected the method that could provide the sensitivity and diagnosticity within the CCTB environment.

Workload Assessment Techniques

Techniques for workload assessment are classified into three major groupings: performance-based methods, physiological measures, and subjective techniques. Each of these methodologies were reviewed to identify techniques appropriate to the CCTB company-level evaluation.

Performance-based methods. Performance-based methods are divided into primary task measures and secondary task measures. Primary task measures use direct measurement of operator performance on the system as the basis for workload assessment. Workload increases are assumed to be indexed by performance degradation. Secondary task methods index workload by introducing a second task to be performed concurrently with the primary task of interest. Workload on the primary task is measured by performance on the secondary task (O'Donnell & Eggemeier, 1986). Both of these performance assessment approaches require deliberate manipulation of the tasks provided to the operator. However, the experimental design of the present evaluation relied on mission exercises that did not involve experimental manipulations at the task level. Since a workload assessment approach that requires manipulations of primary task difficulty would violate the intrusiveness and implementation strictures of the evaluation, primary task methods were excluded from further consideration.

Physiological Measures. Visual scanning patterns, pupillary responses, and changes in heart and respiratory rate are examples of physiological measures that have been used to detect workload differences. Common to all physiological measurement techniques is instrumentation that places sensors or transducers on the operator, or records observable events such as pupillary responses by means of video cameras. While the instrumentation may not directly interfere with operator performance, the preparation of the operator and the constraints imposed (i.e., restricting the area of movement) makes these techniques intrusive from a practical standpoint. Therefore, they were considered too problematic for use with CCTB.

Subjective Methods. The ability of operators to judge or evaluate their cognitive and affective experiences associated with performing tasks is the basis for subjective workload assessment methods. Subjective methods appear to come closest to measuring the essence of mental workload if the emphasis of workload

assessment is on the mental rather than the physical aspects of work (Wickens, 1984). This methodology has much to recommend it in terms of the evaluation criteria listed earlier. Despite some misgivings in the literature about the validity of subjective methods (e.g., Gopher & Donchin, 1986), sufficient evidence has accumulated to indicate that subjective methods are sensitive to changes in workload. Issues of validity and the utility of particular subjective methods are reviewed in the following.

Subjective methods may be categorized as (a) questionnaires and interviews and (b) rating scales (Lysaght et al., 1989). Because quantitative results were desirable for sensitivity and diagnosticity, the predominantly qualitative nature of questionnaire and interview data were judged less useful than rating scale techniques for CCTB workload assessment.

Workload rating scales have been developed using psychometric measurement techniques. Some workload assessments are based on magnitude estimation, paired-comparisons, and equal appearing intervals procedures. Critical evaluations of these methods in general (O'Donnell and Eggemeier, 1986) and Army workload assessment needs in particular (Lysaght et al., 1989), have not recommended their use. Reasons include the requirement to use a reference task for magnitude estimation, the rapid expansion in the number of paired comparisons as the number of target tasks increases, and the limited development of equal appearing interval techniques. In general, these methods have proven successful in laboratory experiments (e.g., their sensitivity is satisfactory), but implementation problems limit their use in actual or simulation-based operational evaluations.

Two rating scale methods that have been applied in various military operational situations are the Subjective Workload Assessment Technique (SWAT)(Reid, Shingledecker, & Eggemeier, 1981) and the NASA-Task Load Index (NASA-TLX)(Hart & Staveland, 1988). Both methods acknowledge the multidimensional nature of subjective experiences of workload (i.e., cognitive, affective, and physiological factors) and individual differences in the importance that operators ascribe to these factors. The SWAT methodology asks operators to provide ratings on three factors -- time load, mental effort, and psychological stress -- each measured on a three-point scale. A total of 27 possible workload values can be determined from all combinations of the three-point scale on each of three factors (3x3x3 = 27). Using conjoint

measurement techniques, an event or task rating is mapped onto an interval scale with 0 signifying no workload and 100 signifying maximum workload. The sensitivity of SWAT to manipulations of task-induced workload has been demonstrated in a number of laboratory and applied settings (Reid & Nygren, 1988). However, cautions have been raised about the conjoint measurement basis of SWAT (Boyd, 1983). Moreover, the time required to develop the scale values prior to actual event rating, and the apparent "learning curve" evidenced by operators using SWAT (Lysaght et al., 1989) discouraged the use of this technique for this evaluation.

The NASA-TLX uses a weighted-bipolar technique to assess subjective workload (Hart & Staveland, 1988; Vidulich & Tsang, 1985). The version considered here is a six-scale derivative of the original instrument (NASA Bipolar) that used ten scales to rate workload. Operators provide a rating of task or event workload on six dimensions: Mental Demand, Physical Demand, Temporal Demand, Performance, Effort, and Frustration Level. For each dimension, scale values extend from low to high (except Performance which extends from failure to perfect) on a line divided into 20 segments.

The operator marks the segment (scale value) that corresponds to his or her subjective experience related to that dimension. For a task or event, ratings on the six scales are weighted by the operator's biases about the importance of each scale to workload. These weights are obtained by a paired-comparison technique in which all possible pairs of the six dimensions are presented to the operator. For each pair, the operator chooses the more relevant dimension of workload with respect to the task or event. The frequency with which each dimension is chosen becomes the weight used for that dimension. Ratings are multiplied by the weights and a weighted average workload score is computed. The weighting procedure is used to reduce the between-subject variability of the final score. The rationale for the weighting procedure and other details regarding the development of NASA-TLX are provided by Hart & Staveland (1988).

Recent evidence confirms that NASA-TLX is sensitive to differences in task difficulty. Bortolussi and his associates (Battiste and Bortolussi, 1988; Bortolussi, Hart, and Shively. 1987) demonstrated that the NASA scales detect greater workload with increases in scenario difficulty in flight simulators.

Vidulich and Tsang (1985) compared SWAT with NASA-TLX and found both techniques sensitive to difficulty differences in laboratory tasks. The validity of NASA-TLX is also supported by numerous studies that show high correlations between SWAT and NASA-TLX measurements of operator workload (Lysaght et al., 1989). Battiste and Bortolussi (1988) also found high test-retest reliability for NASA-TLX used in their flight simulation study.

For diagnostic purposes, NASA-TLX offers six subscales that can be examined for specific sources of workload as compared to SWAT's three. Like all subjective assessment techniques, NASA-TLX can be easily administered at the completion of an exercise. No evidence in the literature suggests low user acceptance of this technique.

In sum, then, the NASA-TLX technique satisfies the five selection criteria for a workload assessment method appropriate for the CCTB company-level evaluation. Since it both meets the technical selection criteria and falls within our definition of workload, NASA-TLX was chosen as the method of workload assessment.

Some modifications were made to the scoring and administration of the NASA-TLX in this evaluation. The most significant was the elimination of the development (via the paired comparisons procedure) and use of weights to adjust each of the subscale ratings. Byers, Bittner, and Hill (1989) recently reexamined the utility of employing this procedure. They compared raw scores and weighted scores across five studies and found the means and standard deviations to be comparable. Moreover, correlations were extremely high ($\underline{R}s \approx .96$ to .98) between the two scoring techniques. They recommended the elimination of the paired comparisons portion of the traditional TLX, but its use can be retained at the discretion of the researcher. To differentiate the traditional TLX from the raw score (unweighted) version, they suggest the term RTLX for the latter.

Research Approach

The introduction of C^3 technological innovations into combat vehicles can be expected to have workload implications for vehicle commanders. The nature and extent of workload changes can be explored through integrating functional representations of C^3

systems into the capabilities of CCTB. By simulating the C^3 systems while they are still in the early development stage, workload data can be obtained that may influence later decisions on such issues as functional specifications, operational procedures, and training requirements.

The original objective of this evaluation was to compare the workload impacts of the CVCC and IVCC with the M1 Baseline. However, near the midpoint of the evaluation, the Army reached a decision that the radio interface unit of the CVCC was a supportable requirement. Because this decision greatly limited the applicability of the IVCC configuration, this condition was eliminated from the evaluation.[1]

Workload was expected to vary between CVCC and M1 Baseline users by task, duty position, and tactical employment of the C^3 systems, the latter reflected by scenario differences. Therefore, the predictions of the magnitude and direction of workload differences between the CVCC and M1 Baseline would involve interactions among all of these factors. The large number of specific combinations of factors precluded detailed enumeration of expected differences. To facilitate designing the workload assessment, the following hypotheses were developed:

1. For a task performed under the CVCC condition, total workload and workload subscale values will be significantly different from workload associated with that task performed under the M1 condition.

2. For a given task, total workload and workload subscale values will be significantly different across three tank commander duty positions (Company Commander, Platoon Leaders, and Wingmen/Platoon Sergeant).

3. For a given task, total workload and workload subscale values will be significantly different between the offensive and defensive scenarios.

[1]Workload data from all IVCC users were collected and subjected to some analyses that appear in the appendixes. However, the results are not examined in this report.

Experimental Design

The experimental design was based on four independent variables. These were task, group, position, and scenario. All soldiers completed workload ratings on tasks drawn from the same standardized list of C^3 tasks. Group identified the soldier's assignment to either the CVCC or M1 Baseline condition. Position referred to the soldier's duty position assignment as a Company Commander (Co Cdr), Platoon Leader (Plt Ldr) or Other TC (either a Platoon Sergeant, Platoon Sergeant's Wingman, or Platoon Leader's Wingman).[2] The fourth independent variable, scenario, identified the offensive or defensive operation under which tasks were performed.

The experimental design for conducting the workload assessment consisted of the between-subjects factors of group (2 levels) and position (3 levels) crossed with the within-subjects factors of task (32 levels) and scenario (2 levels).

Dependent variables consisted of the individual NASA-TLX subscale values and the sum of these values referred to as total workload.

Analysis Plan

Analyses were performed in two phases. The preliminary phase identified the most appropriate methods for CCTB workload analysis. The detailed analysis phase tested the experimental hypotheses using protocol and dependent measures identified as most appropriate during the preliminary analysis.

Preliminary Analyses. The preliminary analyses addressed two methodological issues. First, correlations among the six NASA-TLX subscales were examined to determine whether all of the six NASA-TLX subscales would be included in subsequent analyses. Second, the type of ratings were compared. One type was the rating of tasks as they occurred in specific mission events, referred to as event-based workload assessment. The second type was a rating of a selected set of tasks considering all occurrences of that task

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[2] References to participants of this evaluation, regardless of their duty position assignment, use the generic term tank commander (TC). Specific references to subjects in the group Other TCs use the term Other TCs.

during a scenario. This is referred to as global task workload assessment. A series of two-tailed t-tests was used to test for the differences in workload ratings for a task assessed under event-based and global conditions. The outcome of this comparison was the basis for determining whether event-based or global workload data would be the dependent measure for the detailed analysis.

Detailed Analyses. Workload data were transformed into deviation scores to enable comparisons among tasks relative to a common baseline. The resulting values represented a TC's rating for a specific task as a positive or negative deviation from his rating average, while at the same time, preserving score variances for analysis purposes. The deviation score for a task was computed by subtracting from the task score the TC's average score for all tasks rated. For each TC, separate deviation scores were calculated for total workload and each of the subscales.

Two statistical designs were used to complete the detailed analyses. The first addressed the issue of whether individual task-by-task analyses should be undertaken. This was completed using a group (2 levels) by task (17 levels) mixed design analysis of variance (ANOVA). The primary purpose of this analysis was to test for task differences.

If a significant task main effect was obtained, a second statistical design tested the effects of position, scenario, and group on individual task workload differences with a four factor ANOVA. Two factors of this ANOVA were position and scenario. The other two factors were single degree of freedom planned comparisons. The first was CVCC compared to IVCC. The second was CVCC compared to the M1 Baseline which tested Hypothesis 1. The latter planned comparison crossed with the position and scenario factors tested Hypotheses 2 and 3.

Total workload scores for a task were analyzed with this four factor ANOVA. If the analysis revealed significant main effects or interactions, the same four factor ANOVA was conducted on each of the workload subscales of the task.

To further explore the subscale contributions, a stepwise multiple regression was conducted using the raw subscale scores as independent variables and the total score workload score as the dependent variable. This analysis was limited to CVCC user data to

obtain diagnostic information on sources of workload for that system. Separate analyses were conducted for each task with significant total workload deviation score differences between the CVCC and M1 Baseline groups. The maximum number of steps permitted was set at three. This analysis was a means of determining the amount of variance of total score contributed by the three subscales most highly correlated with the total score.

A TC was excluded from analysis of a task if he was not a member of a duty position that performed that task. Not all the tasks were performed by soldiers in the three categories of duty position (see Table A-1). One task was performed by only Company Commanders, six tasks were performed only by Company Commanders and Platoon Leaders, and ten were performed by TCs in all three duty positions. The SPSS procedure Examine processed total workload scores and identified outliers in the two experimental groups.[3] As a part of all ANOVA runs, optional output was specified to determine if the data were normally distributed or required raw data transformations.

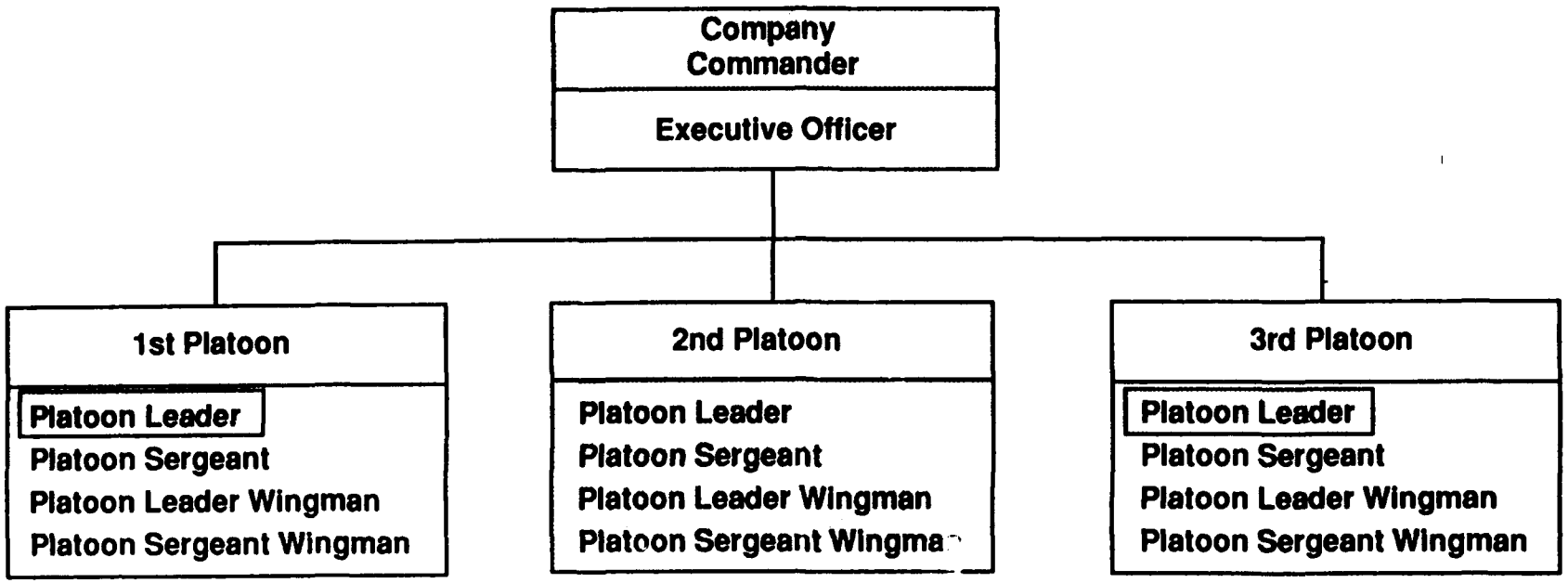
Method

Subjects

Ninety-eight officers and noncommissioned officers served as CCTB TCs and completed workload assessment instruments. Test subjects were drawn from units stationed at Fort Knox, Kentucky.

Commanders of these units assigned individual soldiers, rather than intact tank crews, to participate in the experiment. The primary selection requirement was that the soldiers be qualified for either company commander or tank crew (TC, driver, or gunner) position assignment. Researchers formed tank crews by assigning soldiers to the duty position for which they were qualified. Figure 1 shows the seven TC duty positions that required the assignment of evaluation participants. For each of these TCs, a driver and gunner were also assigned to man the tank

[3]The criterion for outlier identification was any value that exceeded three times the interquartile range of the set of scores. If the total workload score exceeded this value, all data elements contributing to that toal score were excluded from further analysis.



Shading shows the 7 CCTB tank simulators manned with TCs and crews. Other tanks in the 1st and 3rd platoons were controlled by the semi-automated forces capability of CCTB.

Figure 1. Organization of 14 tank commanders (TCs) in a tank company.

simulator. TCs, drivers and gunners served in only one simulator crew. Ammunition loaders, normally the fourth crew member, were not required because ammunition autoloading capability was assumed.

Crews were randomly assigned to one of three experimental groups: IVCC (enhanced intravehicular command and control), CVCC (experimental command and control), and M1 Baseline (current M1 configuration without digital command and control systems). Each subject was informed that his participation was voluntary, and that all data were confidential.

Materials

Exercise Scenarios

The Army Research Institute developed two three-hour exercises, one offensive and one defensive scenario, for simulator execution. Each scenario contained tactical movements, repeated direct fire engagements with the enemy, and numerous enemy encounters requiring multiple exchanges of command and control information among elements of an armor company and the Battalion Tactical Operations Center (TOC). A complete description of the scenarios is provided by Leibrecht et al.(in preparation).

The general tactical situation surrounding both scenarios was that a friendly pure armor company of a battalion task force engaged attacking elements of Soviet motorized rifle regiments. Other companies in the friendly force battalion were notional. The opposing force consisted of elements of Guards Motorized Rifle Regiments equipped with BMPs and T-72s. CCTB generated these forces through its semi-automated opposing force capabilities under the control of a technician. The number of attacking enemy forces in the friendly defensive scenario were considerably greater than the number of defending enemy forces in the offensive scenario.

The scenarios were designed to require TCs to execute command and control tasks under a variety of tactical situations. With the exception of 10 minute rest breaks after the first and second hour, the scenarios were continuous exercises rather than discrete combat vignettes. The exercises were scripted with respect to the opposing forces actions, and structured for the friendly force

through operation orders and occasional directives from the exercise controller in the TOC.

Events for Workload Assessment

For the purposes of workload assessment, the scenarios were examined for mission segments (referred to as events) of moderate to high levels of combat activity. An event was a 5 to 10 minute period during which TC tasks associated with command and control, communicating information, and target acquisition and engagement had a high probability of occurrence. Event onset was a readily identified friendly or enemy action. Events terminated with a "target" task, in most cases the preparation and sending of some form of report.

A total of eight events -- four offensive and four defensive -- were defined from the activities occurring during each exercise. A standardized set of data identified the tactical circumstances surrounding an event: (a) a mission statement, (b) a scenario segment descriptor, and (c) a one or two sentence description of the significant combat actions leading up to that event. Following this block of information, one sentence described the event forming the basis for workload assessment. The eight event definitions, shown as they appeared in the workload assessment instrument, are in Appendix B.

Task Lists

The sources of basic tank commander task listings were the Master CMF 19/SC 12 Task List prepared by the U.S. Army Armor School (1989); an M1A1 task analysis performed by Myers, Cavallo, Eldredge, and Hess (1987); Field Manuals 17-1 (Department of the Army, 1988) and 17-15 (Department of the Army, 1987); and the Mission Training Plans for the tank company (Department of the Army, 1988) and tank platoon (Department of the Army, 1988). Tank commander tasks for workload assessment were identified from these sources based on functional specifications of the CVCC system developed by the Army Research Institute at Fort Knox.

A total of 32 tasks appeared in the final task list shown in Table 2. A subset of 17 tasks, specifically associated with major CVCC functions and expected to be performed with high frequency throughout both scenarios, were designated as global tasks. These tasks and their relationship to CVCC features are shown in

Table 2

Workload Analysis Tasks

Complete Task List	Tasks Selected for Global Workload Assessment
Receive and review a report	
Prepare and send SPOT Report	*
Prepare and send SHELL Report	*
Prepare and send CONTACT Report	*
Prepare and send CFF Report	*
Prepare and send SITREP Report	*
Prepare and send NBC Report	
Communicate with platoon by radio	
Communicate with commander (BN, CO, PL) by radio	
Retransmit/Relay information	
Direct actions of driver	
Direct actions of gunner (including fire commands)	
Analyze the terrain	
Determine location	*
Determine distance or range	
Plan and communicate a route	*
Direct a scheme of maneuver (e.g., bypass)	*
Select covered and concealed route	
Monitor/correct route progress	*
Monitor/correct platoon formation	*
Monitor/correct platoon positions with company	*
Identify and prioritize targets	*
Hand-off target to gunner	*
Engage targets from the commander's station	
Coordinate sector searches	*
Coordinate platoon fires	*
Visually check the security of a position	
Revise/update tactical plan	*
Perform visual surveillance	
Select temporary fighting positions	
Determine OPFOR strength and disposition	*
Observe/assess engagement or attack	

Appendix A. While also appearing as tasks potentially performed during individual events, global tasks were subjected to a separate workload assessment described in the next section.

Workload Assessment Instrument

The workload assessment instrument was designed to obtain workload assessments for tasks directly related to C^3 functions. In addition, other features of the instrument were designed to obtain information on the most effective means of assessing workload in CCTB evaluations. Specifically, the alternative of assessing workload for a task given (a) all experiences with that task or (b) separate instances of performing that task resulted in the global versus event-based assessments described earlier. Descriptive information that provided the tactical context of the events constituted a significant part of the workload assessment instrument.

Task prioritization, another feature of the instrument, was a means to allow the TC to select the tasks he performed during an event and to obtain data for future revisions to the task list. Another feature, a rating scale for event workload, sought information on the ability of the rater to assess workload for an entire event as contrasted to individual task workload.

The workload assessment instrument consisted of two sections, one for the offensive and one for the defensive scenario. Within each section, the instrument was further divided into two blocks. In the first block, TCs rated workload for specific instances of tasks as they occurred during each of the four mission events. Raters could discriminate different levels of workload for a specific task given the particular conditions of the event. In the second block, TCs provided global ratings for each task designated as a global task. In both blocks, the six NASA-TLX subscales were used to obtain rating for each task.

The instrument consisted of 11 by 17 in. pages in a flexible binding booklet. Appendix C contains example pages from the workload assessment instrument (photoreduced from the original size) and a handout of workload scale definitions provided to each TC. A booklet section was comprised of 22 pages. Event-based and global ratings occupied 16 pages (4 events x 4 pages per event) and 6 pages, respectively. Page layout was identical for

each event assessment. Some content items varied with individual events as described in the following.

1. Mission and Event Descriptor. Specific identifying information for the event appeared at the top of each page associated with an event.

2. Part A: Task Selection and Task Priority. A standardized list of 32 tasks from which TCs selected the tasks they (a) considered mission-essential and (b) had performed during the specified event. TCs also prioritized their selected tasks and entered the priority number on a blank line next to the task title. These priority numbers were also used to identify the task being rated for workload in Parts B and C. The event terminating task (i.e., target task) was highlighted on this list.

3. Part B: Workload Assessment of Event Terminating Task. This was the first workload scale the test subject completed. The task rated was the task that terminated the event. The six scales were drawn from the NASA-TLX workload assessment procedure. For each scale the values ranged from 0 to 20. Scale values were not printed on the form. TCs who did not perform that task assigned a priority value of 0 to that task in Part A.

4. Part C: Workload Assessment of Prioritized Tasks. This part consisted of seven workload assessment boxes bound into the booklet. The TC indicated the task rated for workload by writing in that task's priority number. He completed the six subscales as in Part B. Extra sheets were available if the TC chose to rate up to a maximum of ten tasks. Pretesting indicated TCs chose an average of seven tasks to rate for workload.

5. Part D: Overall Event Workload. This final section of the event-based workload assessment asked the test subject if he was able to give a single, overall assessment of his workload for the specified event. If he responded yes, he then completed the workload scales similar to those in Parts B and C.

6. Global Task Workload Assessment. Following the block allocated for the four event-based workload assessments, a set of workload assessment scales appeared for the 17 global tasks. TCs considered workload for each task, taking into account all instances of performing that task during the scenario. The same

workload subscales with a 20 point range used elsewhere in the instrument were duplicated in this block.

An example on the first page of the booklet showed the correct method for recording task selection and prioritization, and for completing the workload assessment scales. TCs entered their simulator number and date on the booklet cover.

Procedure

Assessment Procedures Familiarization

On the second day of crew training, TCs attended a half-hour briefing, demonstration, and question-answer session on the workload assessment procedures for this evaluation. The class presented (a) the definition of workload used for this evaluation and (b) detailed explanations of how to complete all portions of the workload assessment instrument.

The TCs were told that the workload for a situation depends on the kinds of tasks performed, the number of tasks performed, and time available to perform the tasks. The definition of workload presented to the TCs was

> Workload is a term used to describe your subjective reaction to the demand of doing one or more tasks during some period of time.

Briefing slides were accompanied by an explanation of the parts of the workload assessment booklet, the procedure for completing the scales, and the schedule of when the assessments would be made.

Workload Assessment

Figure 2 shows the five-day training, test and evaluation schedule for research participants. On the first two and a half days crews completed training and practice exercises. Workload assessment was conducted at the end of the third and on the fourth days upon the completion of a test scenario.

Immediately after completing the three hour scenario, the TCs moved to a quiet work area and completed the appropriate offensive

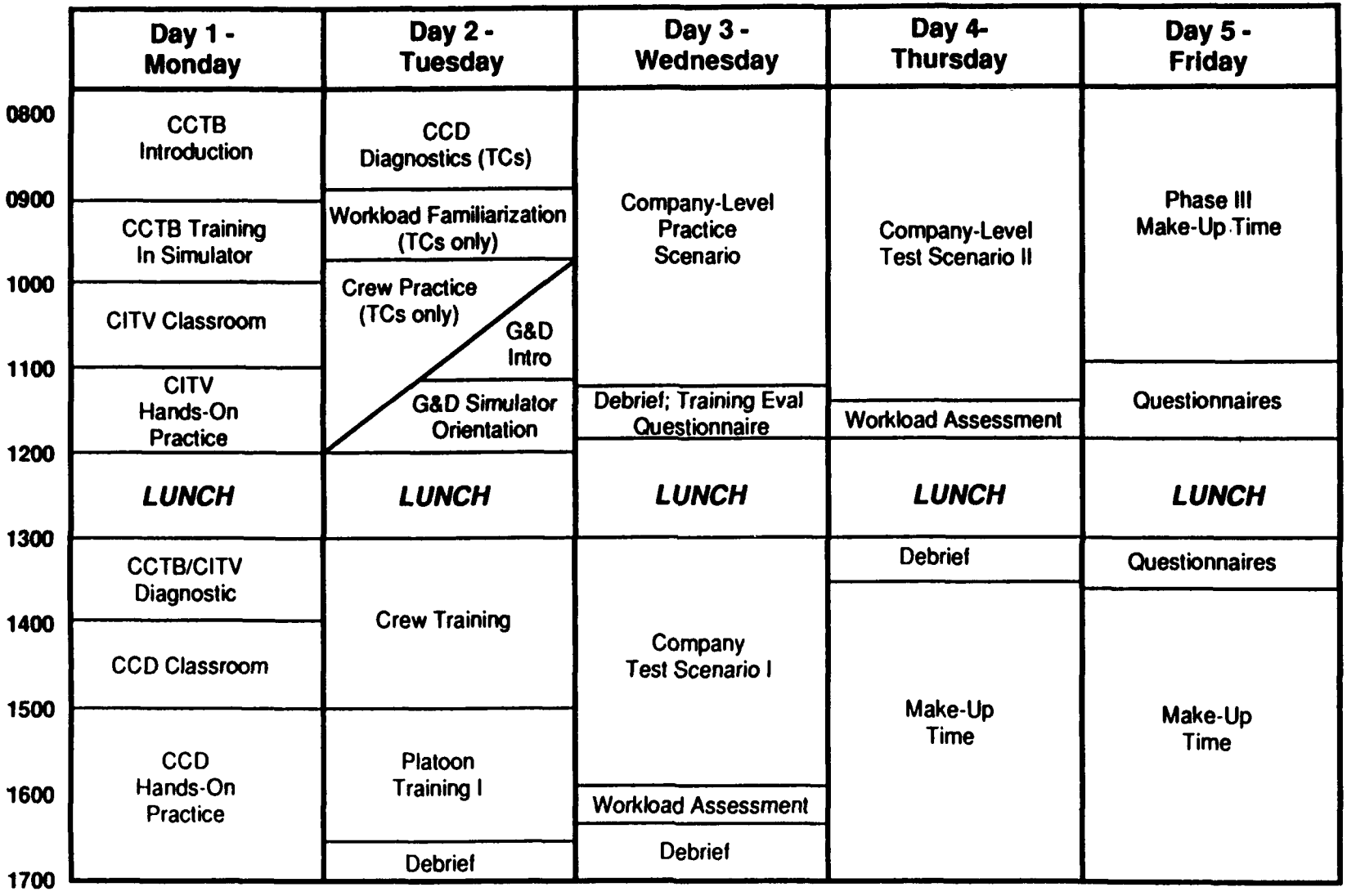


Figure 2. CVCC evaluation weekly schedule.

or defensive portion of the workload assessment booklet. The TCs were instructed to read the event description, and then select and prioritize the mission-essential tasks that they performed during that event.

TCs rated workload for the event target task (Part B), for each selected task (Part C), and the event itself. After completing the first block of the instrument dealing with the four events, the TCs completed the second block consisting of the global task ratings. For an individual workload assessment, the TC had been instructed to consult the workload scale definition on a hand-out (see Table C-1), and then mark the scale with his judgement for that scale. TCs worked at their own pace and completed the assessments in about one hour.

A researcher who had watched the exercise on monitors in the exercise control room was available to answer questions about the assessment procedures. A map with operational overlays describing the scenario was visible to TCs in the work area.

At the end of the second exercise the following day, the seven TCs immediately moved to the work area and completed the remaining portion of the workload assessment booklet. No feedback on specific workload assessments were provided to the tank commanders.

Results

Workload assessment and biographical data were entered into a relational data base and verified prior to data analysis. The identity of individual participants in the experiment was not recorded. The number of TCs in the two experimental groups and CCTB duty positions is presented in Table 3. Biographical data are presented in Appendix D.

Analyses were completed in two phases. The preliminary analyses determined which workload data would be used in the second phase of the analysis. During the second phase, workload ratings were examined in detail. All statistical analyses were performed on the personal computer Version 3.1 of the Statistical Package for the Social Sciences -- SPSS/PC+ [Norusis, 1988(a), 1988(b); SPSS, 1989].

Table 3

Number of TCs in the Two Experimental Groups Categorized by Duty Position

Duty Position	Experimental Group	
	CVCC	M1 Baseline
Company Commander	5	4
1st Platoon Leader	5	4
2nd Platoon Leader	5	4
3rd Platoon Leader	5	4
2nd Platoon Leader Wingman	5	4
2nd Platoon Leader Wingman	5[a]	4
2nd Platoon Sergeant	5	4

[a] *Data from one TC discarded*

Preliminary Analyses

Workload Subscale Correlations

Because some of the event-based tasks had relatively few workload ratings, global task ratings were considered to provide better estimates of correlation coefficients. A correlation matrix was constructed for the six workload subscales using global task data from all groups, positions, and scenarios. Correlations of the subscales showed wide variations by task, suggesting task-specific mixes of the components of workload. Averaging the correlations therefore did not appear warranted. Figure 3 contains the median correlations obtained from the global task data across all subjects, together with the correlations found in Hart and Staveland's (1988) validation studies of the NASA-TLX subscales.

With the exception of the Performance subscale, correlations are moderate (i.e., greater than .55) and generally equal to or somewhat larger than the Hart and Staveland validation results. The Performance subscale in this evaluation showed a weak relationship with the other subscales with only two of the four correlations approaching the levels of the Hart validation results. This may be attributed to TC confusion regarding the direction of the bipolar values of the Performance subscale. High ratings appeared at the left side of the Performance subscale. In contrast, for all the other subscales the left side was associated with low ratings. Because of this confusion, this scale was eliminated from subsequent workload analyses.

Global vs. Event-based Workload Assessment

For a task rated on an event-by-event basis, a TC's total workload rating for that task was averaged across all occurrences within a scenario. This was done for 17 tasks for which a companion global task rating was obtained for that scenario. Paired comparison t-tests were conducted for each of the 17 tasks for each scenario. For a set of 17 comparisons, the error rate experimentwise was set at .003 (the error rate per comparison of .05 divided by 17, the number of comparisons)(Myers, 1972). No significant differences were found for total workload rated under these two conditions. The results are summarized in Tables E-1 and E-2 in Appendix E.

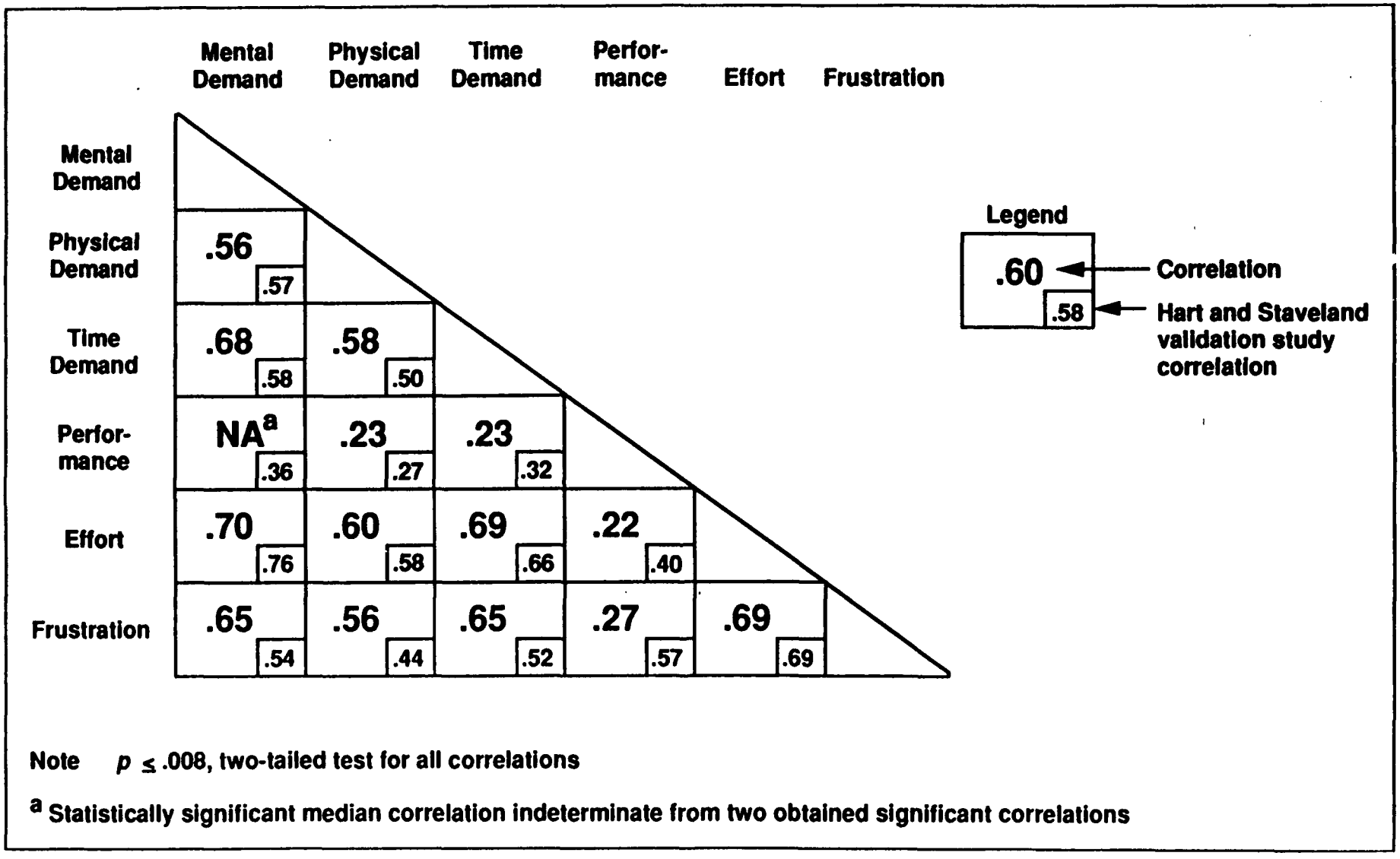


Figure 3. Median correlations of workload subscales for 17 global tasks

The number of workload assessments generated is shown in Table 4. For global ratings the number of assessments is equal to the number of TCs providing the data. For event-based tasks, however, a TC could rate a task from zero to four times during a scenario. Thus, the totals shown in the event-based columns do not necessarily equate to number of subjects rating that task.

A major consideration for using analysis of variance techniques is having sufficient numbers of observations per cell to provide reliable estimates of model parameters and cell means. In examining the mean number of workload ratings per cell listed in Table 4, it is apparent that more reliable estimates could be obtained by using global task data. The lower number of ratings for the event-based assessments derives from the fact different TCs might perform different tasks during each of the events that occurred within a scenario. Therefore, global ratings were used in subsequent analyses of research hypotheses.

A total workload score was computed for each TC by summing across the Mental Demand, Physical Demand, Time Demand, Frustration, and Effort subscales. The SPSS/PC (1989) procedure Examine processed these totals. Of the 1522 values evaluated, 29 (2%) were judged to be extreme. The five subscale score values comprising an outlier were excluded from further analysis. From the remaining data, deviation scores were computed for total workload and each of the five subscales.

Detailed Analyses

Identification of Task Differences

A Position by Task ANOVA was conducted on the global task deviation score total workload ratings. This analysis included 2 levels of the Position factor (Company Commanders and Platoon Leaders) and 16 levels of the Task factor (16 of the 17 global tasks were performed by both sets of TCs). All three positions could not be included because the Other TCs rated only 10 of the global tasks. This ANOVA therefore maximized the number of subjects (n = 51) available to assess position and task differences. However, only 12 TCs out of 51 were included in this analysis because duty position differences did not require all TCs to perform all tasks. This low number of subjects casts doubt on how representative of the total sample the subsample of 12 TCs is,

Table 4

Comparison of the Number of Workload Assessments Obtained for Global and Event-Based Tasks

Task	Global		Event-Based	
	Offense	Defense	Offense	Defense
1. Prepare/Send SPOT Report	90	79	39	38
2. Prepare/Send SHELL Report	67	69	21	22
3. Prepare/Send CONTACT Report	87	81	43	56
4. Prepare/Send CFF Report	47	53	15	22
5. Prepare/Send SITREP Report	90	85	38	31
6. Determine Location	94	87	54	68
7. Plan/Communicate a Route	74	75	33	54
8. Direct a Scheme of Maneuver	57	49	17	14
9. Monitor/Correct Route Progress	80	77	29	52
10. Monitor/Correct Platoon Formation	72	65	15	24
11. Monitor/Correct Platoon Positions within company	60	51	15	15
12. Identify/Prioritize Targets	80	81	51	56
13. Hand-off Target to Gunner	79	80	31	44
14. Coordinate Sector Searches	65	64	14	22
15. Coordinate Platoon Fires	32	32	3	10
16. Revise/Update Tactical Plan	54	50	14	18
17. Determine OPFOR Strength and Disposition	59	57	19	23
Mean ratings per task	69.82	66.76	26.53	33.47
Mean number of WL ratings per cell for an individual task 3 x 3 x 2 (Group by Position by Scenario) Analysis of Variance	3.9	3.7	1.5	1.9

which in turn affects the reliability and utility of this analysis of overall task differences.

The principle experimental design of this evaluation was a mixed design factorial. However, TCs did not perform some tasks and therefore were not required to provide some workload ratings. As a consequence, the resulting data set did not conform to a complete factorial structure. Analysis might have been based on a partially nested design that explicitly recognizes empty cells of a factorial structure. However, no design could be constructed to accommodate the legitimately empty cells of this evaluation. From a repeated measures data analysis perspective, these empty cells appear as missing data. As the ANOVA described above demonstrates, the number of subjects included in repeated measures analyses is particularly vulnerable to reductions from missing data. No satisfactory solution is available for either the factorial design problem (Lindman, 1974) or the missing data problem (Winer, 1971, p. 489). Because any alternative multivariate or univariate technique that considered tasks as a set (i.e., a factor) would encounter this problem, tests of experimental hypotheses were completed for each task individually.

To facilitate presenting the results, the discussion of the analysis of the 17 *global tasks* is grouped into three task categories:

1. Reporting Tasks - Tasks that involved sending and receiving command and control reports

2. Command and Control Tasks - Tasks involving navigation, planning, monitoring, and controlling one's own tank or other tanks in the unit

3. Target Acquisition and Firing Tasks - Tasks involved in detecting, identifying, prioritizing, and engaging enemy targets

Major findings with respect to research hypotheses for each task are summarized in the following sections. Each subsection also provides references to the appendix that contains complete ANOVA summary tables and descriptive statistics for total workload and subscale ratings for the task.

Workload Differences in Reporting Tasks

Analyses of variance of total workload revealed significant effects related to the CVCC and M1 Baseline groups for three of five reports: SPOT, CONTACT, and CFF (Call for Fire). No significant differences between the CVCC and M1 Baseline were found for the Shell report and Situation Report (SITREP).

Prepare/Send SPOT Report. The total scores revealed significantly higher workload for the CVCC TCs as compared to the M1 baseline group. Table 5 summarizes the ANOVA results for the planned comparison of CVCC mean total workload with M1 Baseline mean total workload. Figure 4 shows the total workload differences between these two groups. This comparison was also signficant for the Physical Demand, Time Demand, Effort, and Frustration subscales. No significant interactions of the comparison with other factors were obtained. No position or scenario differences were found for total workload.

For the CVCC group, the order of inclusion of subscales in the stepwise multiple regression equation was Effort, Time Demand and Mental Demand; these variables acccounted for 72%, 14% and 7% respectively of the variance of the multiple correlation. Appendix F1 contains the detailed analyses.

Prepare/Send Contact Report. The CVCC TCs revealed significantly higher workload for this task as compared to the M1 Baseline TCs. Table 5 summarizes the ANOVA results for the comparison of CVCC mean total workload with M1 Baseline mean total workload. Figure 5 illustrates the differences in total workload for the two groups of TCs. The Physical Demand, Time Demand, and Frustration subscales showed significantly higher ratings for the CVCC users as compared to the M1 Baseline users. No significant interactions of this comparison with other factors were obtained. Likewise, no position or scenario differences were found for total workload.

The multiple regression results for the CVCC group showed that subscales entered the equation in the order Frustration, Mental Demand and Effort with these variables accounting for 74%, 15% and 6% of the variance respectively. Complete details of the analyses are found in Appendix F2.

Table 5

Significant F-ratios for the Comparison of CVCC and M1 Baseline Group Workload Means for Reporting Tasks

Workload Scale	REPORTING TASK								
	SPOT			CONTACT			CFF		
	F	*df*	*P*	*F*	*df*	*P*	*F*	*df*	*P*
Total	10.13	1,67	.002	7.07	1,67	.010	5.99	1,47	.018
Mental Demand							5.79	1,48	.020
Physical Demand	11.82	1,68	.001	9.35	1,67	.003	7.02	1,48	.011
Time Demand	5.74	1,68	.019	4.90	1,67	.030	4.75	1,49	.034
Effort	6.58	1,68	.013				5.54	1,48	.023
Frustration	5.35	1,68	.024	4.69	1,67	.034	9.39	1,48	.004

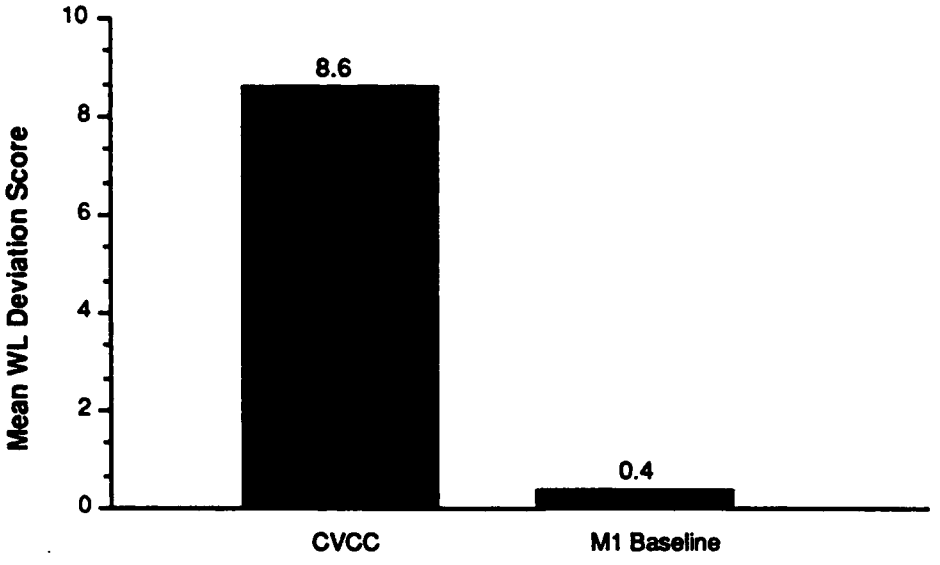


Figure 4. Prepare/send SPOT report: Mean total workload (WL) deviation score group comparison

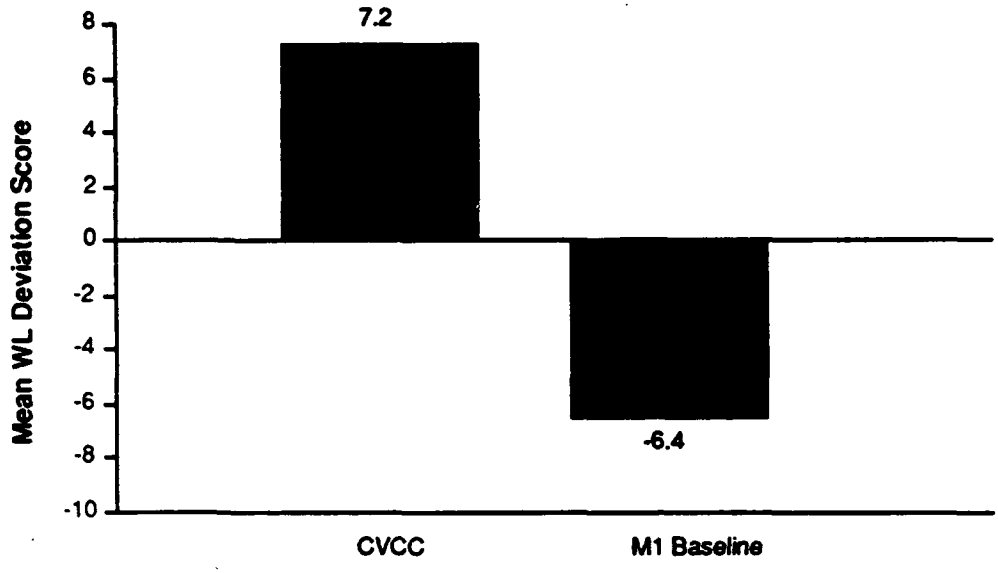


Figure 5. Prepare/send CONTACT report: Mean total workload (WL) deviation scores group comparison.

Prepare/Send a CFF Report. The comparison between the CVCC and M1 Baseline users revealed significant differences for total workload and each of the five subscales. TCs using the CVCC rated workload as higher than M1 Baseline TCs. Statistically significant F-ratios for the comparison of CVCC with M1 are shown in Table 5.

A significant effect was obtained for the total workload planned comparison by position interaction, F (2,47) = 3.24, p = .048. This interaction is shown in Figure 6. Both company commanders and platoon leaders showed an increase in workload with the CVCC as compared to M1 company commanders and platoon leaders.

Time Demand was the only subscale that resulted in a significant planned comparison by position interaction, F (2,49) = 4.86, p = .012. This interaction showed the same profile of mean differences as the total score interaction.

The CVCC group multiple regression analysis resulted in Time Demand, Effort, and Frustration entering the equation in that order. Variance accounted for by these three variables was 89%, 5% and 3% respectively. However, this equation does not take into account the interaction of group with position revealed by the ANOVA. An alternative regression analysis would have required variables in the equation reflecting multiple interactions of CVCC, M1 and position variables. This multivariable equation was judged too complex to provide a revealing picture of variance accounted for by the subscales. ANOVA summary tables and descriptive statistics are in Appendix F3.

Shell and SITREP Reports. No significant total score workload differences were obtained for these tasks. Detailed descriptive statistics and ANOVA summary tables for these two tasks are contained in Appendixes F4 and F5 respectively.

Report Task Summary. Figure 7 depicts the means for reporting tasks for the major comparison of interest--the CVCC versus the M1 group. The figure illustrates a consistent pattern for the means. For reporting tasks, the CVCC had significantly higher mean workload for three out of five tasks: Prepare and Send Spot, Contact and Call for Fire Reports.

While it is tempting to assume that all new designs will decrease workload, this is not always the case. In fact, careful

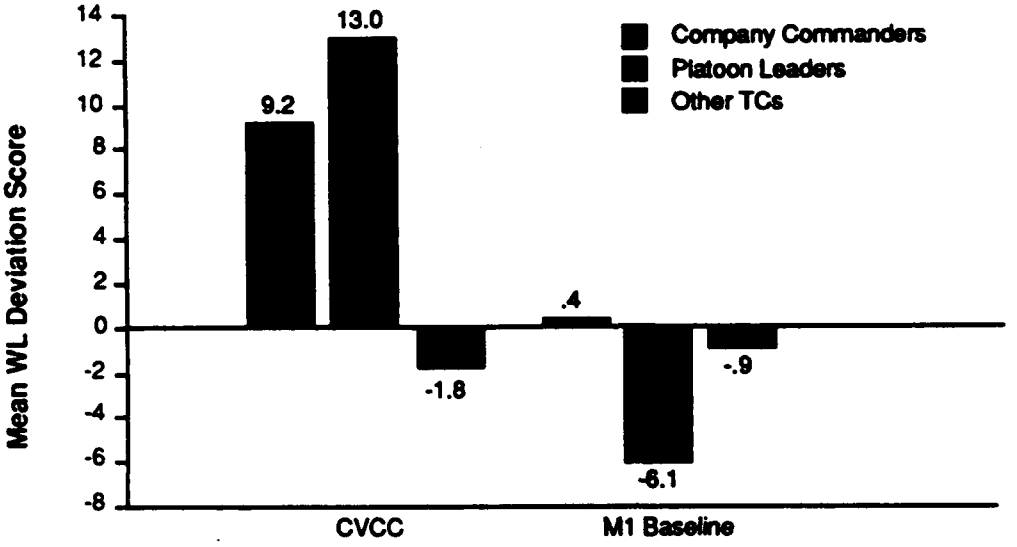
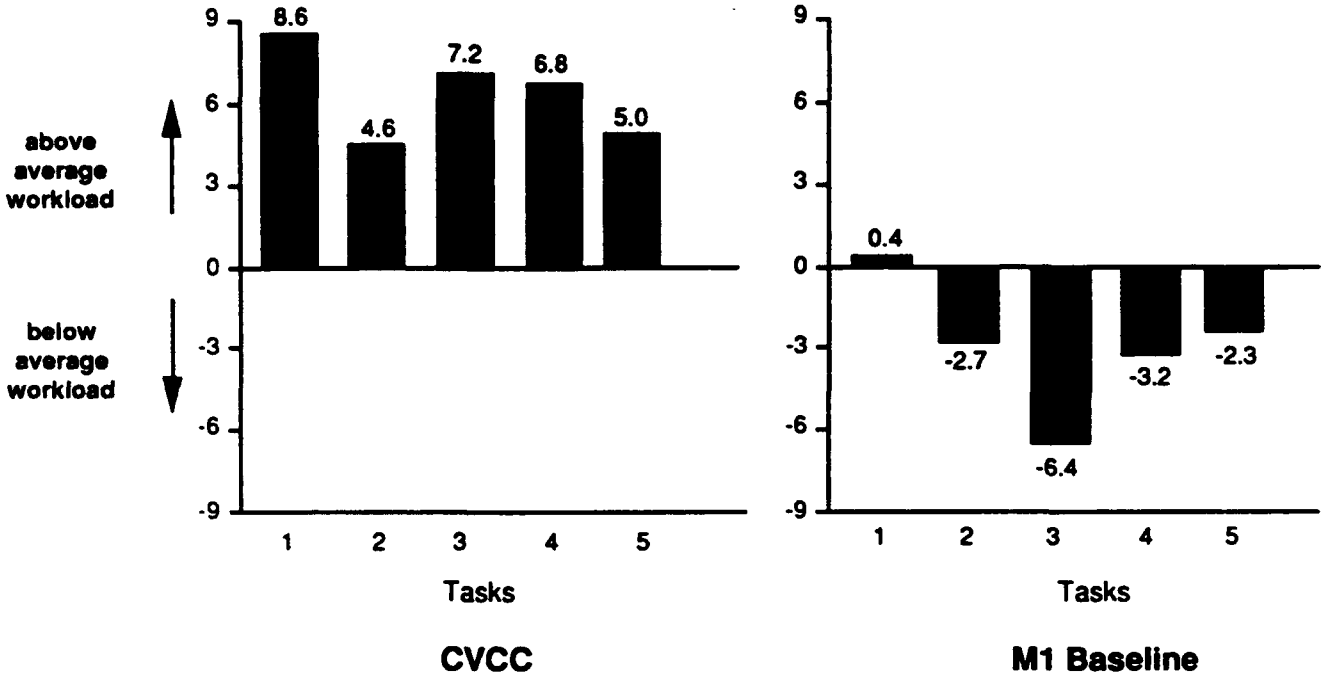


Figure 6. Prepare/send CFF report: Mean total workload (WL) deviation scores group by position interaction.



Tasks	Significant Differences between CVCC and M1 Baseline
1. Prepare/Send SPOT Report	Yes
2. Prepare/Send SHELL Report	
3. Prepare/Send CONTACT Report	Yes
4. Prepare/Send CFF Report	Yes
5. Prepare/Send SITREP Report	

Figure 7. Mean global task total workload deviation scores: Reporting tasks

examination of the CVCC procedures indicate that new behavioral requirements are actually added to the reporting process. With the current M1, tank commanders use their radios to send reports. This leaves their hands and eyes free for critical target acquisition and engagement activities. In the CVCC system, tank commanders must enter each report element into the digital data base. It takes longer to compose a report using this method and it occupies the hands and visual system, thereby making it impossible to simultaneously perform other essential tasks.

In general, one would expect the workload associated with the reports to be highest for company commanders and platoon leaders, since they are the ones who most often develop and send these reports. In normal instances, a tank commander would probably only create and send CONTACT reports and an occasional Shell report. However, company commanders and platoon leaders showed higher workload compared to the M1 Baseline for only one task, Prepare and Send a CFF Report.

In general, the total workload scores did not support the hypothesis of workload differences associated with positions. Small cell sizes for the company commanders may have decreased the capability to detect group differences. Workload did not vary across scenarios for any of the reporting tasks.

The subscale analyses indicate that effort and frustration were the primary sources of workload for the Spot and Contact reporting tasks, respectively. Time Demand emerged as the main source of workload for the CFF task. Mental Demand did not appear as a source of workload in the comparison of the CVCC and M1 Baseline groups. However, it did appear as a source of workload in a separate analysis of CVCC users for the tasks of preparing and sending Spot and Contact reports. Its contribution was less, however, than the contribution of effort and frustration.

Workload Differences in Command and Control Tasks

Analyses of variance of total workload resulted in significant main effects or interactions for three command and control tasks: Determine Location, Direct a Scheme of Maneuver, and Monitor and Correct Route Progress. No significant differences were found for Plan and Communicate a Route, Monitor and Correct Platoon Formation, Monitor and Correct Platoon Positions within

Company, Revise and Update Tactical Plan, and Determine OPFOR Strength and Disposition.

Determine Location. Two effects, the planned comparison of the CVCC group with the M1 Baseline group and the position main effect, were statistically significant for total workload, as shown in Table 6 and Figure 8. The CVCC group reported significantly less workload than the baseline M1 group. This pattern of differences was found for all five subscales. A Newman-Keuls test revealed Platoon Leaders showed lower total workload than the Other TCs, paralleled by lower mental demand, physical demand, and time demand. Company commander workload was not significantly different from platoon leader workload on these scales or total workload.

The multiple regression results for the CVCC group showed the order of inclusion of variables as Mental Demand, Frustration, and Effort accounting for 86%, 10% and 3% of total score variance respectively. These results may be interpreted as sources of workload savings for this task, since workload was less for the CVCC group. The detailed analysis results for this task are found in Appendix G1.

Direct a Scheme of Maneuver. Table 7 and Figure 9 summarize the analysis results for this task. Since Other TCs did not perform this task, only the company commanders and platoon leaders were compared. CVCC usage by company commanders resulted in significantly more workload than company commanders in the M1 comparison group, F (1,40) = 7.15, $p < .05$. However, workload for platoon leaders was not significantly different between the CVCC and M1 Baseline, F (1,40) = 2.61, $p > .05$. The Physical Demand, Time Demand, and Frustration subscales mirrored these results. A multiple regression was not performed on the subscales because of the difficulty in interpreting the interactions of CVCC with the position term. Complete ANOVA summary tables and descriptive statistics are found in Appendix G2.

Monitor/Correct Route Progress. The comparison between the CVCC and M1 Baseline groups revealed the only significant differences in workload associated with this task. The ANOVA results and illustration of the group means are provided in Table 8 and Figure 10, respectively. The CVCC group rated its total workload lower than the M1 group. Lower Physical Demand and Effort

Table 6

Significant F-ratios for Determine Location Workload ANOVAs

Workload Scale	CVCC compared with M1 Baseline			Position Main Effect		
	F	*df*	*p*	*F*	*df*	*p*
Total	47.48	1,76	.0001	6.92	2,76	.002
Mental Demand	35.98	1,76	.0001	11.14	2,76	.0001
Physical Demand	37.56	1,76	.0001	8.41	2,76	.001
Time Demand	27.46	1,76	.0001	6.98	2,76	.002
Effort	18.54	1,76	.0001			
Frustration	28.91	1,76	.0001			

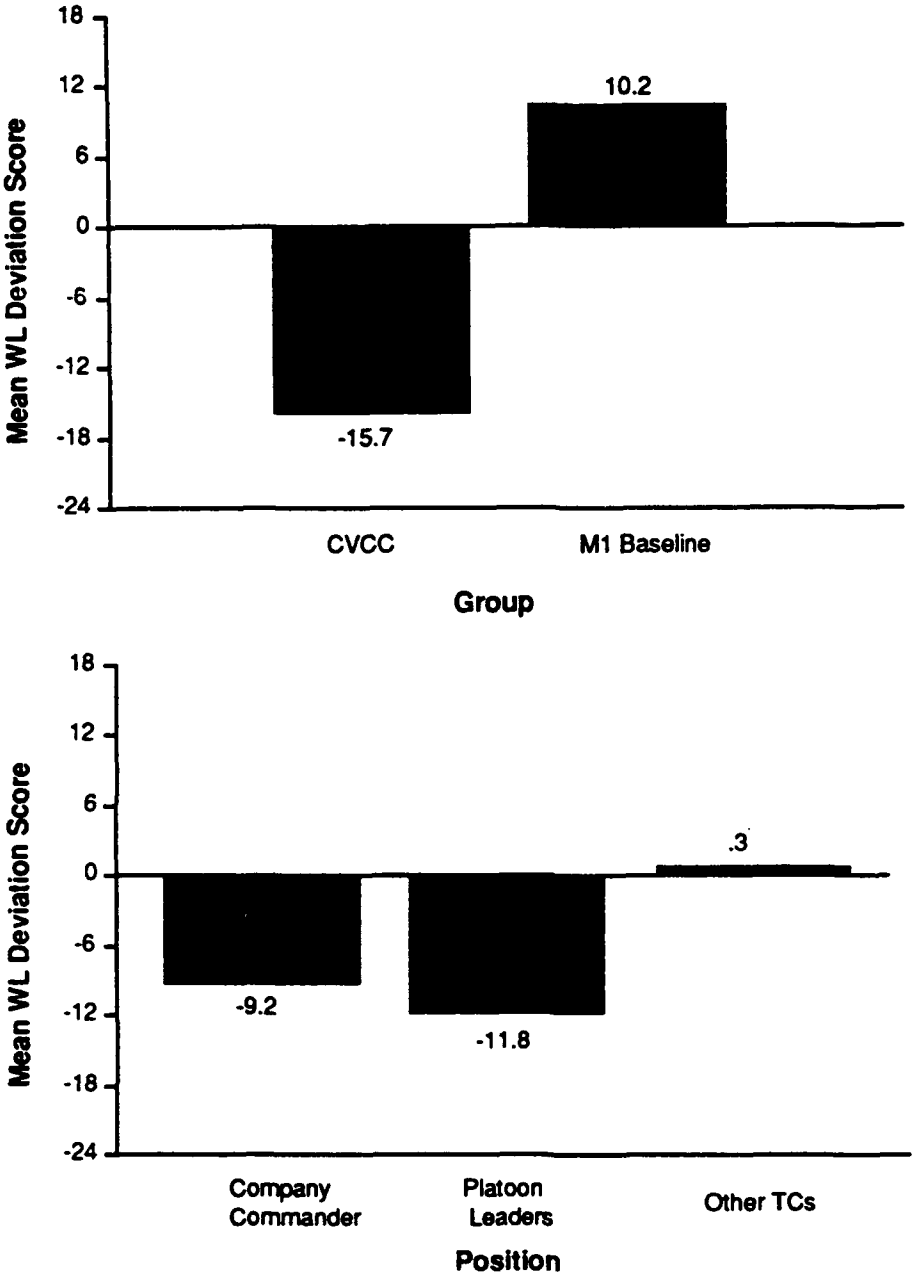


Figure 8. Determine Location: Total workload (WL) deviation score group and position comparisons

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Table 7

Significant F-ratios for Direct a Scheme of Maneuver Workload ANOVAs

Workload Scale	Planned Comparison by Position Interaction		
	F	*df*	*p*
Total	8.72	1,40	.005
Physical Demand	9.86	1,40	.003
Time Demand	4.14	1,40	.049
Frustration	9.56	1,40	.004

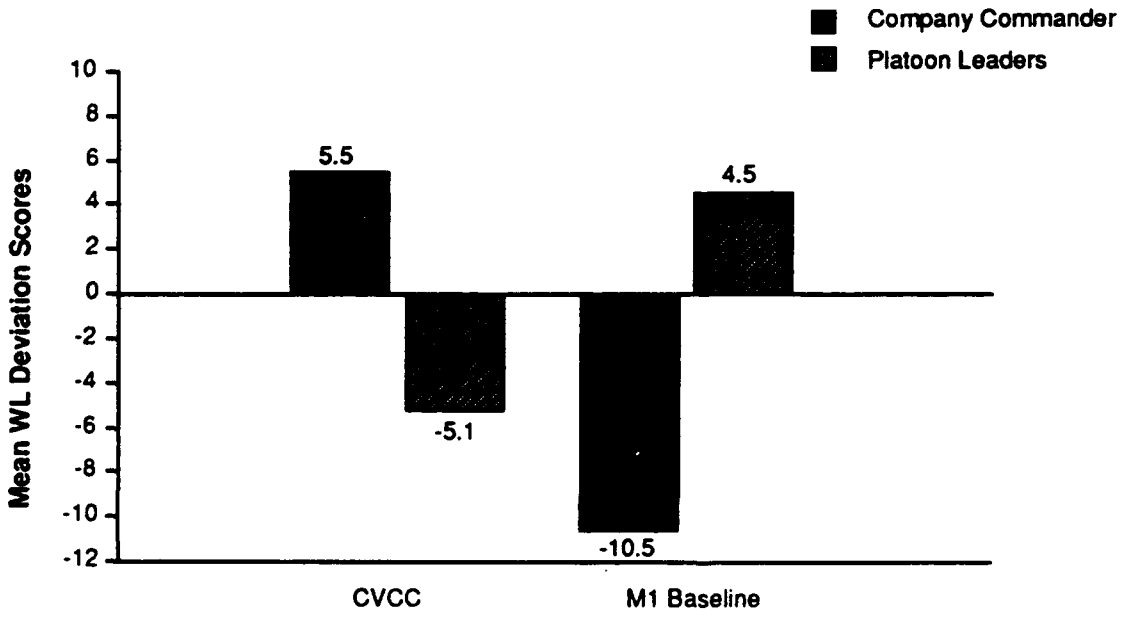

Figure 9. Direct a scheme of maneuver: Mean total workload (WL) deviation score planned comparison by position interaction

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Table 8

Significant F-ratios for Monitor/Correct Route Progress ANOVAs

Workload Scale	CVCC compared with M1 Baseline		
	F	*df*	*p*
Total	4.13	1,60	.047
Physical Demand	4.40	1,60	.049
Effort	5.27	1,60	.025

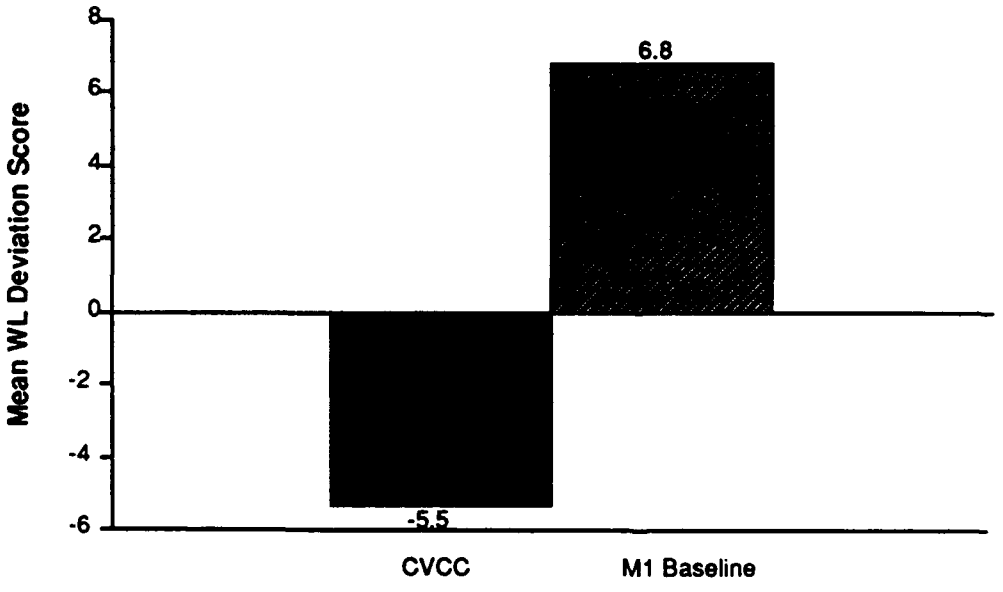

Figure 10. Monitor/correct route progress: Mean total workload (WL) deviation score for groups

ratings were obtained for the CVCC group in the comparison with the M1 Baseline group.

The multiple regression for the CVCC group revealed that the Time Demand subscale accounted for 80% of total score variance, followed in order by the Effort (12%) and Physical Demand (3%) subscales. Since workload was less for the CVCC users, the multiple regression identifies the sources of reduction in workload. This analysis, together with the ANOVA summary tables and descriptive statistics, are found in Appendix G3.

Other Command and Control Tasks. No significant effects involving the comparison of the CVCC with the M1 Baseline, position or scenario were found for the other tasks of this category. Detailed summaries of the analyses can be found as follows:

Plan and Communicate a Route	Appendix G4
Monitor and Correct Platoon Formation	Addendix G5
Monitor and Correct Platoon Positions within Company	Appendix G6
Revise and Update Tactical Plan	Appendix G7
Determine OPFOR Strength and Disposition	Appendix G8

Command and Control Task Summary. The CVCC directly automates functions associated with two navigation tasks -- Determine Location and Monitor and Correct Route Progress. The task of determining location (i.e., identifying the grid coordinates of one's location on the battlefield) is completely automated. The TC simply has to look at the CCD. On the other hand, with the current M1 he must read maps and look through the vision blocks to determine location. It is no surprise, then, that workload associated with determining location was significantly lower for the CVCC group than the M1 group. This difference is shown in Figure 11. Workload reduction for determinining location with the CVCC appears to be affected most by a reduction in mental demand.

The CVCC also greatly automates the process of monitoring and correcting progress along a route. The TC can simply look at the CCD to see where his tank is in relationship to the route waypoints displayed on the CCD. Heading corrections for getting back on the desired path are automatically transmitted to the driver. In line with this automated capability, the CVCC users rated their workload as significantly lower than their

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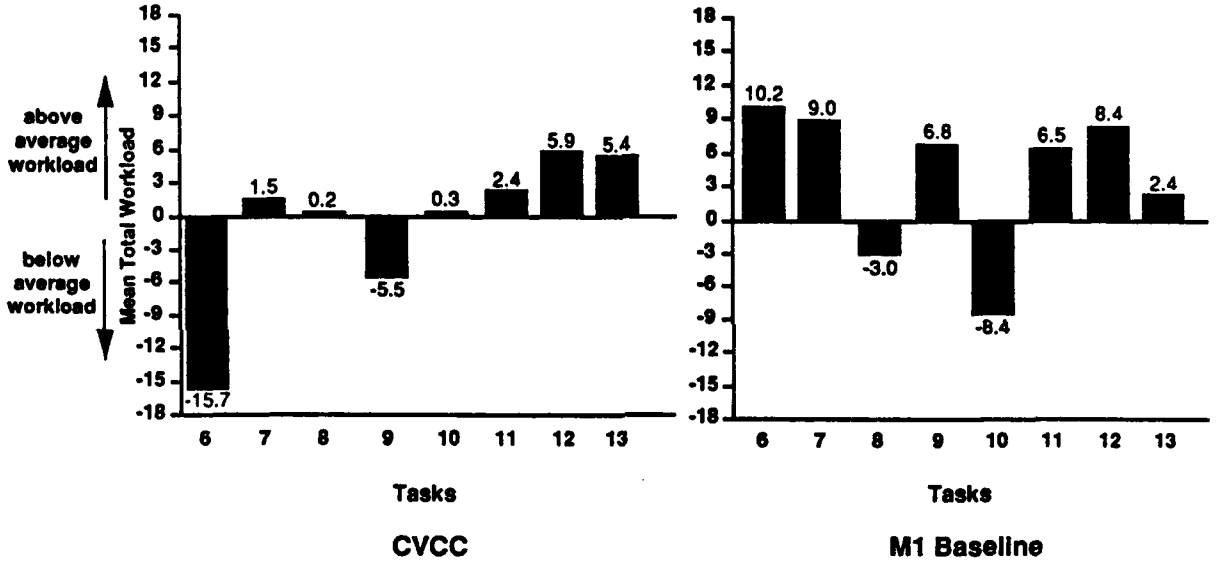


Tasks	Significant Differences between CVCC and M1 Baseline
6. Determine location	Yes
7. Plan and communicate a route	
8. Direct a scheme of maneuver	
9. Monitor and correct route progress	Yes
10. Monitor and correct platoon formation	
11. Monitor and correct platoon positions within company	
12. Revise/update tactical plan	
13. Determine OPFOR strength and disposition	

Figure 11. Mean global task total workload deviation scores: Command and control tasks

counterparts in the M1. Workload savings appears to be affected most by the reduced time demand associated with performing this task on the CVCC.

Platoon leaders who used the CVCC to direct a scheme of maneuver may have benefited from attending to only their vehicle positions and generating fewer communications than the company commanders using the CVCC. Company commanders had three times as many vehicle positions to consider when viewing their CCDs. In addition, messages to and from the three platoons would be expected to be high while directing a scheme of maneuver. Recall that workload assessment events entailed engagements with the enemy. Company commanders would be expected to be observing all their tank positions on the CCD and generating high levels of digital message traffic during these periods. Because directing a scheme of maneuver is a task that stretches over more time than other tasks, increased workload for the company commanders using the CCD is a reasonable finding. M1 Baseline company commanders simply did not have the amount of tactical information available to them as did the CVCC-equipped company commanders.

It is important to note that, with one exception, CVCC workload was equivalent to M1 Baseline workload or reduced for tasks in this category. A *finding of no* significant differences between the CVCC and M1 is a positive result, supporting the conclusion that TCs performing these tasks with the CVCC did so without significant decrements of cognitive capacity.

Workload Differences in Target Acquisition and Firing Tasks

Coordinate Sector Searches was the only task in this category with workload differences. No significant differences between the CVCC and M1 Baseline groups were found for the tasks Identify and Prioritize Targets, Hand-off Target to Gunner and Coordinate Platoon Fires.

Coordinate Sector Searches. For all duty positions, this task generated below average workload. Position differences were the only statistically significant effects found for this task as shown in Table 9 and Figure 12. Company commanders perceived the least total workload, a finding reflected also in the Physical Demand, Time Demand, and Effort subscales. Newman-Keuls tests showed the only one significant difference among the three duty positions for total workload. Company commanders reported less

Table 9

Significant F-ratios for Coordinate Sector Searches Workload ANOVAs

Workload Scale	Position Main Effect		
	F	*df*	*p*
Total	4.88	2,62	.011
Physical Demand	3.24	2,62	.046
Time Demand	3.28	2,62	.044
Effort	4.32	2,62	.017

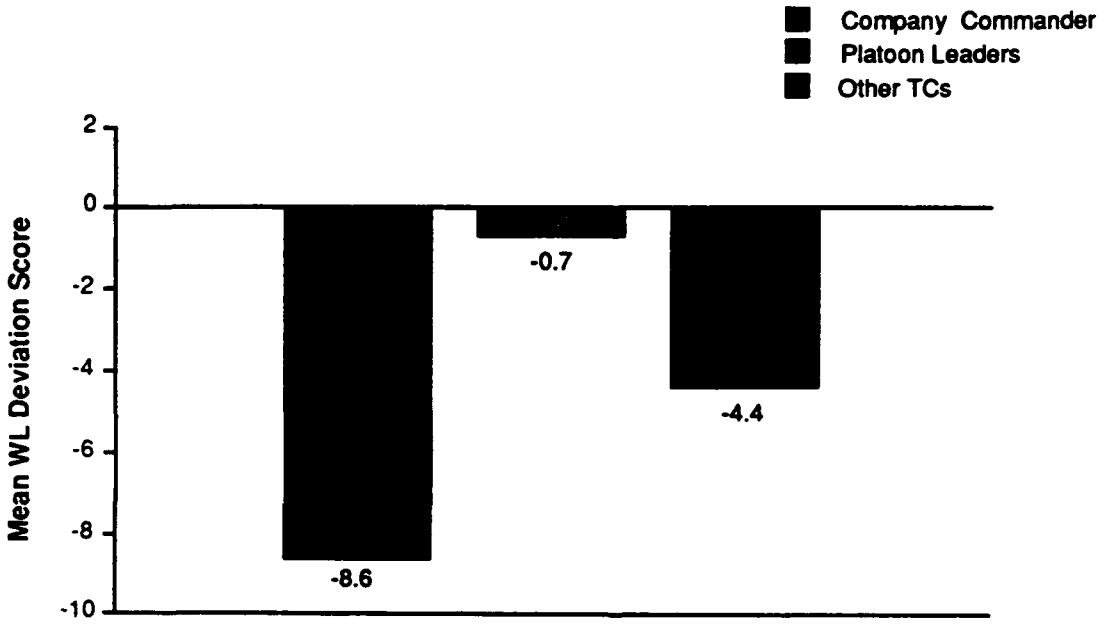


Figure 12. Coordinate sector searches: Mean total workload (WL) deviation score group comparison

total workload than the other two duty positions. Platoon Leader and Other TC workload was not significantly different.

A multiple regression of subscales with total workload was considered for the company commanders using the CVCC. However, only five company commanders used the CVCC, too few subjects to conduct the analysis. Detailed ANOVA results and descriptive statistics are found in Appendix H1.

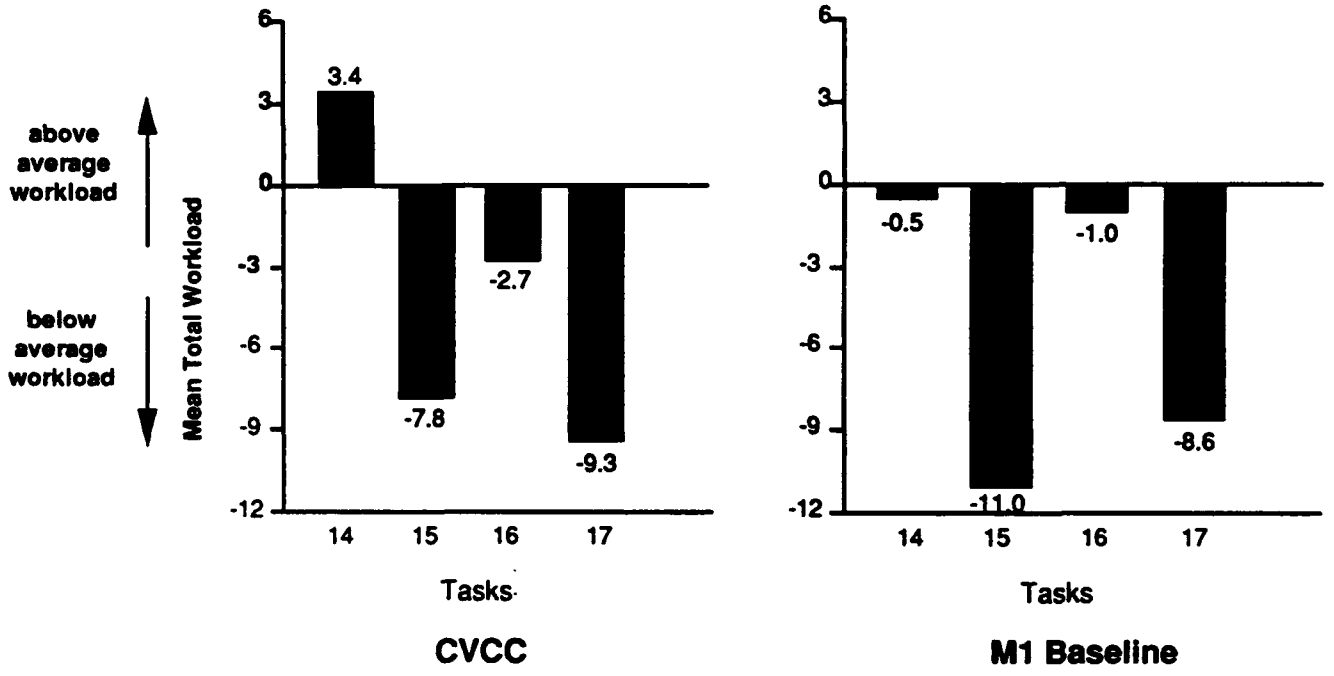
Other Target Acquisition and Firing Tasks. No significant workload differences were found for the planned comparison of the CVCC with the M1 Baseline, positions, or scenarios for the remaining tasks of this category. Analyses of these tasks are found in the following Appendixes.

Identify and Prioritize Targets	Appendix H2
Hand-off Target to Gunner	Appendix H3
Coordinate Platoon Fires	Appendix H4

Target Acquisition and Firing Tasks Summary. A comparison of the mean total workload scores for the CVCC and M1 Baseline groups is shown in Figure 13. Statistical analyses revealed no significant differences between these two groups for the four tasks of this category. The only position difference found among these tasks was for company commanders rating the task of coordinating sector searches. Perhaps workload was significantly less for them because they did not control sector searches at the company level. Instead, they may have deferred that task to the platoon leaders. In general, it appears tasks in this category generated the least workload of the three categories of tasks in this evaluation.

Conclusions

Assessment of operator workload is an important consideration for determining human performance implications of new system designs. A unique opportunity to assess workload during the developmental phases of new systems is provided when evaluating these new designs in a simulator environment (Quinkert, Black & Lipscomb, 1988). The use of a simulator to evaluate new systems is a realization of the "rapid prototyping" design philosophy that seeks early estimations of workload and other human performance implications of specific design concepts. Of course, the most



Tasks	Significant Differences between CVCC and M1 Baseline
14. Identify/prioritize targets 15. Hand-off target to gunner 16. Coordinate sector searches 17. Coordinate platoon fires	None

Figure 13. Mean global task total workload deviation scores: Target acquisition and firing tasks

reliable estimates result when intended users can operate the systems in real or near-real operational situations. However, once the system is developed to the point at which it can be evaluated in an operational environment, it is probably too late and, in any case, too costly to make significant changes in the operator-system interface.

This report describes the workload assessment portion of a larger investigation that employed the rapid prototyping approach in CCTB. The primary interest of the workload assessment was a comparison of the M1 baseline system with the M1 whose capabilities were changed by incorporation of the CVCC, a concept for an advanced combat vehicle command and control system.

This investigation lead to specific conclusions on workload associated with tasks performed on the CVCC system. In addition, a variety of recommendations for future workload assessments in CCTB emerged from our experiences with this evaluation. Each is discussed in the sections that follow.

Evaluation of CVCC Workload

Tank commanders rating the CVCC registered above their individual workload averages for all five reporting tasks. The M1 Baseline workload for these tasks was at or below individual workload averages. Comparisons between these two groups revealed workload for the CVCC group was greater than that of the M1 group in three out of five tasks -- Preparing and Sending a Spot Report, Preparing and Sending a Contact Report, and Preparing and Sending a Call for Fire. This was probably due to the fact that using the CVCC required TCs to interact with one or more menus using in some cases up to 22 responses. In the current M1, reports are generated by a brief radio transmission of known information. With the CVCC TCs must interact with the primary user interface, the CCD, which prolongs the performance of reporting tasks and occupies the TC's psychomotor (i.e., right hand) and visual resources.

Analysis of the CVCC users' workload subscales revealed that effort, frustration, and time demand were the primary sources of increased workload for these tasks. Mental demand, which encompasses thinking and decision making, did not appear as a significant source of workload for CVCC users. However, users of the CVCC perceived an increased investment in time and energy in

using the device. An emotional reaction to using the CVCC for these tasks appeared as increased ratings of frustration.

The command and control category of tasks is composed primarily of navigation and maneuver tasks. A strong trend for above average workload appeared in the M1 group. In contrast, the CVCC configuration was responsible for workload savings in three tasks. Two of these were key navigational tasks--Determine Location and Monitor/Correct Route Progress. This decrease was probably due to the fact that the CVCC displayed information critical to these tasks in an extremely accessible format. Only a couple of cursor movements were needed to access the information.

Savings in mental demand for determining location and time demand in monitoring route progress were revealed by the subscale analyses. These findings are consistent with the fact that own vehicle location was displayed as grid coordinates and all vehicle locations as icons on the map display. Computations of one's own location was therefore eliminated, accounting for the decrease in mental demand. Monitoring one's own movement with respect to terrain and other vehicles, or monitoring other vehicles' position and movement, were achieved by quick reference to the graphical display.

Duty position workload differences were obtained for Direct a Scheme of Maneuver, the remaining task in this category that showed significant differences between the CVCC and M1 users. Company commanders using the CVCC reported higher workload than their M1 counterparts in performing this task, probably due to (a) the amount of information--vehicle locations and message traffic -- available for decision making and (b) the extended period of time implied by the performance of this task. Platoon leaders revealed no workload differences between the CVCC and M1 Baseline. Apparently, the platoon leaders could effectively manage the tactical information, generated by the three tanks under their command, which was consolidated and displayed on their Commander's Control Displays (CCD).

The third category of tasks, target acquisition and firing, showed below average workload for the M1 group and, with the exception of one task, the CVCC group. However, there were no statistically significant differences in workload between these two groups on the four tasks in this category. A duty position difference was found for the task of coordinating sector searches.

Company commanders rated their workload as significantly less than the platoon leaders and other TCs (i.e, the platoon sergeant and wingmen).

In summary, only 3 of the 17 global tasks rated for workload revealed increased workload for the CVCC users. For all other tasks CVCC workload was equal to or less than that of the M1 Baseline group. The tasks with increased workload for CVCC users were the tasks of Prepare and Send a Spot Report, Prepare and Send a Contact Report, and Prepare and Send a Call for Fire (CFF) Report.

An increase in workload associated with duty position was found in only one task, Prepare and Send a Call for Fire (CFF) Report. For this task, company commanders and platoon leaders showed an increase in workload when using the CVCC as compared to M1 users. Other comparisons of duty position associated with the CVCC versus M1 comparison resulted in no differences or, in the case of Determine Location, a decrease in workload.

The offensive and defensive scenarios did not result in significant differences in workload.

Methodological Issues

The NASA-TLX scales provide a proven instrument for assessing workload in operational settings. The company-level evaluation discussed in this report demonstrated that the NASA-TLX, a subjective workload assessment technique, is readily adapted to the particular conditions of the CCTB simulation environment. A recent recommendation by Byers, Bittner and Hill (1989) allowed administration and scoring of the NASA-TLX by eliminating the paired comparison portion of the procedure. This permitted a greater number of workload assessments in the allocated time than would have been possible otherwise.

However, as with most techniques and procedures for assessing workload or other factors associated with the operator-system interface, the application of NASA-TLX places special requirements on the researcher. One requirement is the careful identification of the appropriate operator tasks, relevant duty positions, and new system functions that focuses the workload assessment. Ideally, a workload assessment instrument should be tailored for

each operator, taking into account the specific tasks performed with respect to the system functions provided. For this evaluation, the scripted exercises were not designed to control the specific tasks performed during any mission segment.

To deal with this constraint, a dual approach to workload assessment was employed. For one part, the operator identified the tasks actually performed, and rated workload for these tasks in terms of the specific mission and operational conditions of the scenario. This was termed event-based workload. The second part of the approach asked the operators to rate workload for a task, considering all experiences of performing that task. These global task ratings were completed for a predetermined set of tasks.

The global task approach proved more effective for a number of reasons. First, the fixed list of 17 tasks led to a higher response rate than the event-based approach. Secondly, the global approach appeared better suited to the retrospective character of the assessment procedure. The data suggest that the average of event-based ratings for a task were very similar in magnitude to the global rating for that task. A single global assessment therefore appears as a reasonable summation of raters' experience with that task. Thirdly, a single global task rating for a task is more manageable with respect to independent variables of an evaluation (e.g., experimental groups, duty position) than multiple measurements of a task resulting from an event-based approach. The event-based approach would create a problem of aggregating all occurrences of a task, unless the intent was high resolution analysis at the individual event level. Fourth, the use of global tasks supports the use of deviation scores. It is more logically consistent to develop deviation scores within a single frame of reference (e.g., all occasions of performing a task) than with the event-based approach that is based on separate frames of reference (e.g, specific conditions) of performing a task.

The global task approach can be improved by providing raters with definitions of the tasks. This would be especially helpful for different duty positions, for which the elements of the task or its scope may vary. In addition, raters of workload should be asked to make ratings only for tasks that they have actually performed. Ideally, raters should only be permitted to assess a task if they have performed it several times. Information on frequency of performance should routinely be obtained from raters. The identification of tasks performed, and determination of their

frequency of performance, would benefit from videotaping selected duty positions (see O'Brien, Morey & Wigginton, in preparation). The possibilities of this approach should be considered in future evaluations.

Use of the NASA-TLX subscales for diagnostic purposes appears a useful companion analysis to total workload analysis. Because only a few tasks in this evaluation showed significant increases in workload, a thorough exploration of the potential of this type of analysis was not possible. It appears, however, that the use of multiple regression to explore the subscales is a more direct means to discovering the subscale contributions than separate ANOVAs on the subscales. In this evaluation a multiple regression was performed on the subscales for the CVCC group alone since the primary purpose of this evaluation was identifying sources of workload for the CVCC configuration. Subscale multiple regressions for duty positions would have resulted in either (a) confounding of the CVCC and M1 factors with duty position or (b) higher order interaction terms in the multiple regression that would have been difficult to interpret given the five subscales being evaluated.

Future workload evaluations that use a factorial structure or nested design could use multivariate analysis of variance (MANOVA) to evaluate both experimentally manipulated variables and variance associated with the subscales. The subscales would be multiple dependent measures of the MANOVA. Independent variables such as those used in this evaluation could be explored with respect to the subscales that contribute to main effects and interactions of interest. Analyses would need to be conducted on the raw NASA-TLX scores to ensure estimates of all between- and within-subjects main effects. For presenting mean differences in figures and tables deviation scores could be readily derived from group means and the overall mean. However, this approach would require careful selection of the task set and control of the conditions (events) under which they are performed. This would be necessary to ensure complete data sets essential for the MANOVA approach.

The different patterns of subscale correlations from task to task argue for conducting analyses at the task level. This is especially important if subscale analyses will be conducted. Transforming rating data into deviation scores enables comparisons to be made about the relative amount of workload generated by individual tasks within a set of tasks. This facilitates the

interpretation of the workload results when only the workload data are being considered. This was the case of this effort that was focused on the collection and description of workload data. Further analysis and interpretation of the CVCC workload rlesults can be made by comparing the workload data provided in this report with CVCC system and unit performance reported by Leibrecht et al. (in preparation).

The full six subscales should be retained for any subsequent CCTB workload analysis. The Hart and Staveland (1988) validation results show that all the six subscales contribute to the measurement of workload. Raters using the NASA-TLX instrument need to be cautioned about the directionality of the performance subscale to insure valid ratings on that dimension.

Recommendations

The NASA-TLX workload assessment subscales, administered without the traditional subscale weighting procedure, were shown to be sensitive to both task, experimental group (CVCC and M1), and duty position differences in this evaluation. Future CCTB evaluations should continue to use the six scale NASA-TLX (or NASA-RTLX, the name suggested for the nonweighted version). The global task approach to workload assessment should be effective for workload assessments conducted at the completion of long exercises. Event-based assessment might be considered for assessments that occur immediately after a mission segment or event. Factorial or partially nested experimental designs are essential for comparing multiple independent variables and diagnosing workload sources by subscale analyses.

The CVCC revealed increased workload for only three of 17 tasks evaluated. Since the sources of workload for these tasks were primarily effort and frustration, training or procedural changes may make use of the CVCC for report sending more effective.

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Appendix A

Major CVCC and IVCC System Features

Table A-1

Major CVCC and IVCC System Features Supporting Tank Commander Tasks

Task	Performed by	Major System Features		*Notes*
		CVCC	IVCC	
1-5. Prepare/Send Reports • SHELL • SPOT • CONTACT • CFF • SITREP	• All TCs	• Develop report on CCD w/ job aiding features • Automatic receiving and queuing of reports • Save, Retrieve, Retransmit reports • Automatic digital transmission of report • Laser Range Finder capability from CITV) for target/object UTM's and range • Voice transmission of reports available as option	• Develop report on CCD as job aid. • Save, Retrieve own reports only • Receive reports via radio only; no queuing capability • Voice only transmission of report	• CVCC incorporates intervehicular report and position location exchange. IVCC capabilities are intravehicular (i.e., useful as job aid) • Laser Range Finder (LRF) of CITV is independent of standard LRF of the tank • CVCC has dual cursor control: on CCD and Commanders Control handle. IVCC has cursor control only on Commanders Control Handle.
6. Determine Location	• All TCs	• Own location as icon on terrain map • Grid coordinate current location continuously updated • Current location automatically sent in reports • Independent Laser Range Finder capability (from CITV) • Can analyze terrain using map display	• Own location as icon on grid map • Grid coordinate current location continuously updated	• IVCC map display is grid only; CVCC map display has both grids and terrain features • IVCC has monochrome display; CVCC has color display • CITV LRF provides automatic UTM coordinates of vehicle, terrain features and target reference points, in addition to range
7. Plan and Communicate a Route	• Co Cdr • Platoon Leaders	• Can analyze terrain features on map display • Select and store 1-6 waypoints in route plan • Retrieve and implement route files	• Use auto-advance waypoint capability or individually designate waypoints • Select and store 1-6 waypoints in route plan • Retrieve and implement route files	• Waypoints used by system to provide a steer-to-display feature for driver. Distance to destination and deviations from course constitute drivers display

Table A-1 (cont'd)

Task	Performed by	Major System Features		*Notes*
		CVCC	IVCC	
8. Direct a Scheme of Maneuver	• Co Cdr • Platoon Leaders	• See locations and headings of own and other friendly vehicles on map display • Terrain features display on map • Retrieve copies of reports and FRAGOs • See locations of enemy vehicles • Variable map scales • Send/receive route plans • Can analyze terrain features on map displays	• Post icons to map display from radio messages • Variable map scales	
9. Monitor/Correct Route Progress	• All TCs	• Automatic updating of own vehicle location on map display • Create and/or receive route plan • Create/modify waypoint list • Activate alternative route from own or message file	• Automatic updating of own vehicle location on map display • Create/modify waypoint list • Activate alternative route from own route file	• Positions of icons on map displays continuously updated
10. Monitor/ Correct Platoon Formation	• Co Cdr • Platoon • Leaders	• See locations and headings of own and other friendly vehicles on map display • Receive/transmit route files	• See location of own vehicle on map display	• Positions of icons on map displays continuously updated
11. Monitor/ Correct Platoon Positions within Company	• Co Cdr	• See locations and headings of own and other friendly vehicles • FRAGO text and graphics retransmit/relay capability	• See location of own vehicle on map display	• Positions of icons on map displays continuously updated

Table A-1 (cont'd)

Task	Performed by	Major System Features		Notes
		CVCC	IVCC	
12. Identify and Prioritize Targets	• All TCs	• Scan battlefield and acquire targets in manual or autoscan mode of CITV • View battlefield independent of gunner with CITV • Use target stack capability • Use IFF capability • Immediate designation of priority target via CITV. • See icons of enemy vehicles on map display via messages	• Scan battlefield and acquire targets in manual or autoscan mode of CITV • View battlefield independent of gunner with CITV • No target stack capability • No IFF • Immediate designation of priority target via CITV • No automatic posting of enemy vehicle icons.	• Target stack allows TC to search area using CITV, designate targets by location and priority, and enter them into memory. • IFF - ability of system to automatically determine if target is Friendly, Enemy, or Unknown when CITV laser range finder activated.
13. Hand-off Target to Gunner	• All TCs	• Acquire targets with CITV • Use target designate capability • Use IHF feature of CITV • Use target stack capability	• Acquire targets with CITV • Use target designate capability	• Target designate feature brings main gun and gunners sight in line with CITV line-of-sight
14. Coordinate Sector Searches	• Co Cdr • Platoon Leaders	• Retransmit/relay SPOT and CONTACT reports • Use CITV and gunners sights in coordinated scans across platoon • Use auto-scan capability of CITV • Use capabilities of GPS and CITV in coordinated effort: 3X-10X, BH-WH and independent fields of view • Use terrain features on map display to develop sectors	• Post information to CCD from radio reports • Use CITV and gunners sights in coordinated scans across platoon • Use auto-scan capability of CITV • Use capabilities of GPS and CITV in coordinated effort: 3X-10X, BH-WH and independent fields of view	• Auto-scan permits CITV to scan back and forth from two preset azimuths at a preset rate.

Table A-1 (cont'd)

Task	Performed by	Major System Features		Notes
		CVCC	IVCC	
15. Coordinate Platoon Fires	• Co Cdr • Platoon Leaders	• Enter target info into CITV and hand-off targets to own gunner, or other platoon/section tanks • Coordinate auto-scan searches across platoon • Use terrain features on map display to analyze factors such as intervisibility, avenues of approach etc.	• Use map grid display to plan fires	
16. Revise/Update Tactical Plan	• Co Cdr • Platoon Leaders	• Use maps scroll and variable scale features • Receive, display and relay FRAGOs and other reports • Retrieve and display multiple old • FRAGOs and reports Receive/transmit route plan files	• Use map scroll and variable scale features • Post friendly or enemy icons on map display manually • Review own old reports	
17. Determine OPFOR Strength and Disposition	• All TCs	• See number and locations of enemy vehicles on map display (from INTEL, CONTACT and SPOT reports). • Conduct surveillance with CITV • Use IFF capability of CITV	• Manually post icons to map from radio reports • Conduct surveillance with CITV	• CITV doubles a crew's capability to conduct surveillance.

Appendix B

Workload Assessment Event Descriptions

Offensive Scenario Event 1

Mission: Movement to Contact — Event OF-1 (BDM I.B2b)
Segment: Initial Contact with Enemy
Tactical Situation:

Your unit was withdrawing from artillery fire and came into contact with 3 enemy BMPs. You came under direct fire, became decisively engaged, and developed the situation.

Event to be Rated:

From the time direct fires started until you sent your CONTACT report.

Offensive Scenario Event 2

Mission: Offense — Event OF-2 (BDM I.B3c)
Segment: Fight for Objective Bronze
Tactical Situation:

There was a fight at Objective Bronze that involved both tank fires and indirect fire support

Event to be Rated:

From the time the fight began until you called for fire support (CFF).

Offensive Scenario Event 3

Mission: FRAGO #1 — Event OF-3 (BDM II.B3d)
Segment: Enemy contact
Tactical Situation:

Your unit crossed PL PAM and fought an enemy MRP. You observed destroyed howitzers and BMPs.

Event to be Rated:

From the time you first observed the enemy until you sent your SPOT report.

Offensive Scenario Event 4

Mission: FRAGO #2 — Event OF-4 (BDM III.B2b)
Segment: Movement to contact
Tactical Situation:

Your unit was executing the second FRAGO. You had crossed PL Tammy moving towards Objective Gold. You started to receive artillery fire.

Event to be Rated:

From the time shelling started until the time you sent your SHELLING report.

Figure B-1. Offensive scenario event descriptions

Defensive Scenario Event 1

Mission: Defense of BP 10 — Event DF-1 (BDM LB1-3)
Segment: Enemy Assault
Tactical Situation:

Your unit had assisted the rearward passage of lines of battalion elements through your battle position. A heavy concentration of enemy tanks and BMPs attacked your position.

Event to be Rated:

From the time you made initial contact with the enemy up to the time you planned your displacement.

Defensive Scenario Event 2

Mission: Delay in Sector — Event DF-2 (BDM I.C1-3)
Segment: Displacement
Tactical Situation:

The enemy was sustaining heavy losses, and your unit reached the disengagement line.

Event to be Rated:

From the time you received the order to displace until you sent your SITUATION Report from your subsequent battle position.

Defensive Scenario Event 3

Mission: FRAGO #1 — Event DF-3 (BDM II.B3)
Segment: Defense of Battle Position
Tactical Situation:

Your unit was defending BP 14 against an enemy attack from the southeast. The fight included heavy direct fire exchanges and enemy indirect fire.

Event to be Rated:

From the time you came under attack by enemy helicopters until you sent an air attack SPOT Report.

Defensive Scenario Event 4

Mission: FRAGO #2 — Event DF-4 (BDM III.A2-3)
Segment: Movement to BP 13
Tactical Situation:

Your unit responded to FRAGO #2 by moving to a new battle position on high ground in the vicinity of PL TRUMP.

Event to be Rated:

From the time you received your order to move until you sent a SITUATION report from your new battle position.

Figure B-2. Defensive scenario event descriptions

Appendix C

Workload Assessment Instrument Example Pages and Definitions of Workload Subscales

Circle Your Duty Position: Company Commander

Platoon Leader

TC

Mission: Defense of BP 10
Segment: Enemy Assault
Tactical Situation:

Your unit had assisted the rearward passage of lines of battalion elements through your battle position. A heavy concentration of enemy tanks and BMPs attacked your position.

Event to be Rated:

From the time you made initial contact with the enemy up to the time you planned your displacement.

PART A

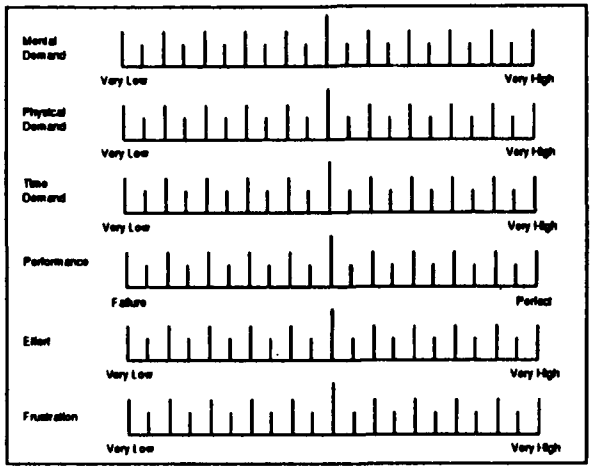
Circle the tasks you performed during this event. Next, prioritize the tasks (1 = highest priority, 2 = next highest priority and so on).

Task Priority	Task
	Receive and review a report
	Prepare and send SPOT Report
	Prepare and send SHELL Report
	Prepare and send CONTACT Report
	Prepare and send CFF Report
	Prepare and send SITREP Report
	Prepare and send NBC Report
	Communicate with platoon by radio
	Communicate with commander (BN, CO, PL) by radio
	Retransmit/Relay information
	Direct actions of driver
	Direct actions of gunner (including fire commands)
	Analyze the terrain
	Determine location
	Determine distance or range
	Plan and communicate a route
	Direct a scheme of maneuver (e.g., bypass)
	Select covered and concealed route
	Monitor/correct route progress
	Monitor/correct platoon formation
	Monitor/correct platoon positions with company
	Identify and prioritize targets
	Hand-off target to gunner
	Engage targets from the commander's station
	Coordinate sector searches
	Coordinate platoon fires
	Visually check the security of a position
	Revise/update tactical plan
	Perform visual surveillance
	Select temporary fighting positions
	Determine OPFOR strength and disposition
	Observe/assess engagement or attack

PART B

Rate your workload for this task:

Plan and communicate a route



PART C

Select another task you circled in Part A.

What is the PRIORITY NUMBER of the task you selected?

1 2 3 4 5 6

7 8 9 10 11 12

Now complete the workload scale for that task.

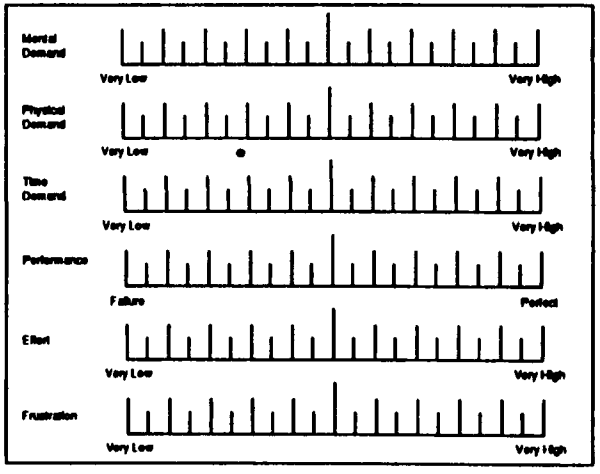


Figure C-1. Mission block, event description, and Parts A-C of CVCC evaluation workload assessment instrument

Mission: Movement to Contact
Segment: Initial Contact with Enemy
Tactical Situation:

Your unit was withdrawing from artillery fire and came into contact with 3 enemy BMPs. You came under direct fire, became decisively engaged, and developed the situation.

Event to be Rated:

From the time direct fires started until you sent your CONTACT report.

PART D

Do you think you can give a workload rating for the ENTIRE event?

Yes No

If you answered YES, complete the workload rating scale.

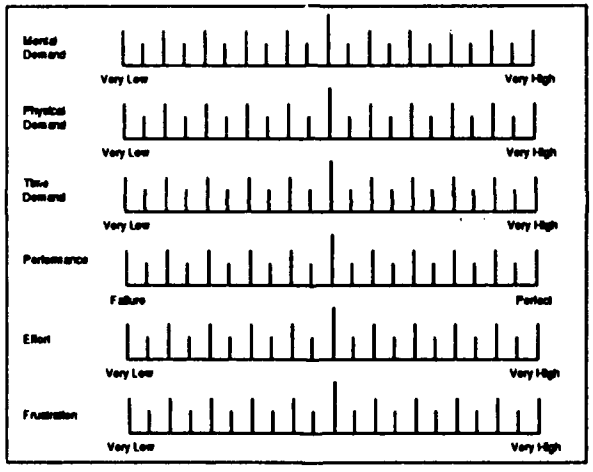


Figure C-2. Part D of CVCC evaluation workload assessment instrument

Circle Your Duty Position:

Company Commander Platoon Leader TC

For this workload assessment, we are interested in your experience performing this task in SIMNET during **OFFENSIVE** operations. While on the offense, you performed each task listed below numerous times under a variety of conditions. For each task, think back on all the instances that called for performing the task. Then provide an overall assessment of the workload you experienced when you performed this task.

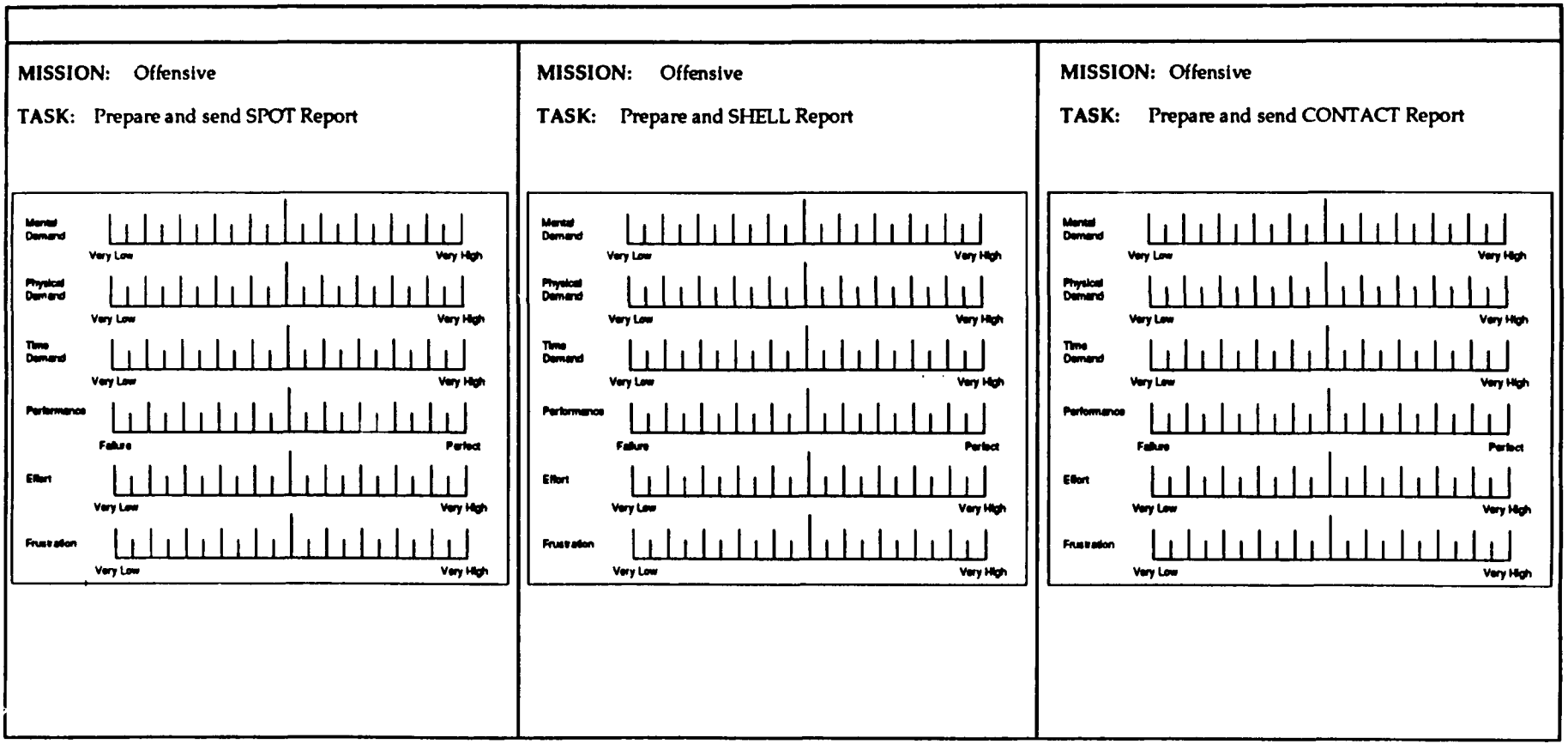


Figure C-3. Example of global task block of CVCC workload assessment instrument

Table C-1. Definitions of Workload Assessment Subscales

TITLE	ENDPOINTS	DESCRIPTORS
Mental Demand	Low/High	Mental activity required. This includes tasks that require thought, decisions, calculations, memory, searching, and others. Did you consider the tasks easy or difficult, simple or demanding, precise or general?
Physical Demand	Low/High	Body movement required. This includes tasks that require pushing, pulling, sliding, controlling. Did you consider the tasks slack or strenuous, easy or laborious?
Time Demand	Low/High	Time pressure associated with completion of tasks. Was the pace slow or rapid? Did the tasks require continual deadlines or permit slack periods?
Performance	Failure/Perfect	Success. How successful were you in doing what was required and how satisfied were you in what you accomplished?
Effort	Low/High	Expenditures. How much energy do you have to expend to complete the tasks? Very little effort or continual drain of your resources?
Frustration	Low/High	Paybacks of task. Did you consider your attitude toward the tasks as secure or insecure, gratified or discouraged, relaxed or stressed?

Appendix D

Tank Commander Biographical Data

Table D -1

Biographical Data

Descriptor	Officers	Enlisted
Age (years)	*M* = 25.9 *SD* = 3.3	*M* = 30.9 *SD* = 4.9
Rank (n)	Captain 7 1st Lieutenant 18 2nd Lieutenant 31	Sergeant First Class 8 Staff Sergeant 24 Sergeant 10
Months Commissioned	*M* = 30.7 *SD* = 28.0	--
Months Enlisted	--	*M* = 132.3 *SD* = 50.0
Months of Field Experience	*M* = 11.7 *SD* = 12.7	*M* = 35.1 *SD* = 40.1
Months of TC Experience	*M* = 9.5 *SD* = 20.0	*M* = 59.8 *SD* = 46.9
Hours on SIMNET-T	*M* = 46.0 *SD* = 46.5	*M* = 51.6 *SD* = 64.7
Education (n)	College Graduate 43 Post Graduate 13	High School Graduate 17 Some College 23 College Graduate 2

Appendix E

Comparison of Event-Based and Global Workload Ratings

Table E-1

Comparison of Global and Event-based Workload Ratings by Task (Offensive Scenario)

Task	Global Workload		Event-based Workload				
	M	*SD*	*M*	*SD*	*t*	*df*	2-tailed *p*
Prepare/Send Spot Report	57.7	19.5	55.9	17.8	1.14	38	.262
Prepare/Send SHELL Report	61.0	20.3	52.5	20.3	2.58	20	.018
Prepare/Send CONTACT Report	52.9	21.8	54.6	21.4	-.87	41	.390
Prepare/Send CFF Report	54.1	17.1	55.8	17.3	-.72	13	.483
Prepare/Send SITREP Report	58.2	23.0	56.9	21.8	.89	37	.379
Determine Location	53.4	24.5	55.0	21.7	-.79	53	.436
Plan/Commo Route Pgrs.	61.5	26.0	58.9	19.8	.93	31	.357
Direct Scheme of Maneuver	66.4	21.7	67.8	14.5	-.26	13	.801
Monitor/Correct Route	48.9	20.0	49.5	15.9	-.23	27	.819
Monitor/Correct Platoon Formation	51.4	23.0	61.1	20.5	-2.61	13	.022
Monitor/Correct Platoon Persons in Company	56.0	19.1	56.6	17.1	-.19	14	.851
ID/Prioritize Targets	52.9	20.3	55.1	19.3	-1.22	49	.228
Hand-off Target to Gunner	42.4	14.6	44.6	15.4	-1.03	30	.312
Coordinate Sector Searches	50.1	22.1	51.9	20.4	-.65	13	.525
Coordinate Platoon Fires	58.3	18.0	71.0	13.9	-.80	2	.507
Revise/Update Tactical Plan	75.9	18.3	77.5	23.3	-.28	10	.786
Determine OPFOR Strength and Disposition	59.0	18.0	60.4	19.1	-.45	16	.657

Table E-2

Comparison of Global and Event-based Workload Ratings by Task (Defensive Scenario)

Task	Global Workload		Event-based Workload				
	M	*SD*	*M*	*SD*	*t*	*df*	2-tailed *p*
Prepare/Send Spot Report	55.0	18.5	57.5	17.7	-1.09	36	.283
Prepare/Send SHELL Report	54.8	21.4	55.9	18.3	-.28	19	.783
Prepare/Send CONTACT Report	52.9	20.8	56.1	18.9	-1.74	51	.088
Prepare/Send CFF Report	53.5	21.5	55.5	19.8	-1.04	19	.311
Prepare/Send SITREP Report	57.8	19.8	62.0	19.8	-1.59	28	.122
Determine Location	48.5	24.6	49.7	21.2	-.77	61	.446
Plan/Commo Route	57.4	20.2	58.1	17.9	-.43	51	.668
Direct Scheme of Maneuver	51.7	21.8	63.8	21.8	-2.31	11	.041
Monitor/Correct Route Pgrs.	52.0	22.6	53.5	21.1	-.90	45	.374
Monitor/Correct Platoon Formation	52.6	23.6	52.3	18.3	.13	22	.898
Monitor/Correct Platoon Persons in Company	57.5	23.8	59.7	16.3	-.48	13	.636
ID/Prioritize Targets	55.2	22.1	54.9	20.5	.15	52	.882
Hand-off Target to Gunner	37.3	21.8	41.4	20.2	-1.41	39	.167
Coordinate Sector Searches	48.3	23.6	51.6	17.1	-.95	19	.356
Coordinate Platoon Fires	58.6	23.6	61.4	21.7	-.54	8	.603
Revise/Update Tactical Plan	68.1	23.9	73.3	16.2	-.82	14	.425
Determine OPFOR Strength and Disposition	58.6	21.5	61.1	20.1	-.88	20	.387

Appendix F

Reporting Task Analysis of Variance Summaries, Descriptive Statistics, and Multiple Regressions

Appendix F1
Prepare/Send Spot Report

Variable or term	Description
GRP(1)	ANOVA factor comparing CVCC with M1 Baseline
GRP(2)	ANOVA factor comparing CVCC with IVCC
T1DFDVN	Total workload deviation score for defensive scenario
T1OFDVN	Total workload deviation score for offensive scenario
TSK1DVN	Total workload deviation score--mean across scenarios
T1DFMD	Mental Demand subscale deviation score for defensive scenario
T1OFMD	Mental Demand subscale deviation score for offensive scenario
T1AVMD	Mental Demand subscale deviation score--mean across scenarios
T1DFPD	Physical Demand subscale deviation score for defensive scenario
T1OFPD	Physical Demand subscale deviation score for offensive scenario
T1AVPD	Physical Demand subscale deviation score--mean across scenarios
T1DFTD	Time Demand subscale deviation score for defensive scenario
T1OFTD	Time Demand subscale deviation score for offensive scenario
T1AVTD	Time Demand subscale deviation score--mean across scenarios
T1DFEF	Effort subscale deviation score for defensive scenario
T1OFEF	Effort subscale deviation score for offensive scenario
T1AVEF	Effort subscale deviation score--mean across scenarios
T1DFFR	Frustration subscale deviation score for defensive scenario
T1OFFR	Frustration subscale deviation score for offensive scenario
T1AVFR	Frustration subscale deviation score--mean across scenarios

Multiple regression variable	Description
T1WL	Total workload rating for task
CMT1WL1	Mental Demand subscale score for task
CMT1WL2	Physical Demand subscale score for task
CMT1WL3	Time Demand subscale score for task
CMT1WL5	Effort subscale score for task
CMT1WL6	Frustration subscale score for task

Deviation Scores: Task 1 - Prepare/Send SPOT Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	11714.89	67	174.85		
CONSTANT	2690.41	1	2690.41	15.39	.000
GRP(1)	796.97	1	796.97	4.56	.036
GRP(2)	1770.59	1	1770.59	10.13	.002
POSITION	629.12	2	314.56	1.80	.173
GRP(1) BY POSITION	591.40	2	295.70	1.69	.192
GRP(2) BY POSITION	644.64	2	322.32	1.84	.166

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	3416.48	67	50.99		
SCENARIO	85.69	1	85.69	1.68	.199
GRP(1) BY SCENARIO	25.68	1	25.68	.50	.480
GRP(2) BY SCENARIO	8.19	1	8.19	.16	.690
POSITION BY SCENARIO	90.45	2	45.22	.89	.417
GRP(1) BY POSITION B Y SCENARIO	180.09	2	90.04	1.77	.179
GRP(2) BY POSITION B Y SCENARIO	304.37	2	152.19	2.98	.057

"Deviation Scores: Task 1 - Prepare/Send SPOT Report".

Cell Means and Standard Deviations
Variable .. T1DFDVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	2.649	8.761	4	-11.292	16.590
POSITION	Plt Ldrs	5.770	5.923	13	2.191	9.349
POSITION	Other TC	6.613	14.137	13	-1.930	15.157
GRP	CVC2					
POSITION	Co Cmdr	22.818	.000	1		
POSITION	Plt Ldrs	16.900	11.237	9	8.262	25.537
POSITION	Other TC	5.081	10.961	12	-1.883	12.045
GRP	M1 Base					
POSITION	Co Cmdr	.015	12.083	3	-30.001	30.032
POSITION	Plt Ldrs	-.355	16.554	11	-11.476	10.766
POSITION	Other TC	3.479	5.430	10	-.405	7.363
For entire sample		5.768	11.946	76	3.039	8.498

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Variable .. T1OFDVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	6.139	5.286	4	-2.272	14.551
POSITION	Plt Ldrs	5.463	8.244	13	.481	10.445
POSITION	Other TC	1.344	13.485	13	-6.805	9.493
GRP	CVC2					
POSITION	Co Cmdr	21.273	.000	1		
POSITION	Plt Ldrs	9.051	7.820	9	3.040	15.061
POSITION	Other TC	3.330	13.314	12	-5.129	11.789
GRP	M1 Base					
POSITION	Co Cmdr	-1.549	7.540	3	-20.279	17.182
POSITION	Plt Ldrs	2.093	7.003	11	-2.612	6.798
POSITION	Other TC	-3.245	6.036	10	-7.563	1.073
For entire sample		3.180	10.152	76	.860	5.500

Deviation Scores: Task 1 - Prepare/Send SPOT Report

Summaries of TSK1DVN
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			4.4741	9.8339	76
GRP	1	IVC2	4.7438	8.8948	30
GRP	2	CVC2	8.6040	11.1643	22
GRP	3	M1 Base	.3511	8.2240	24

Total Cases = 91
Missing Cases = 15 OR 16.5 PCT.

Summaries of TSK1DVN
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			4.4741	9.8339	76
GRP	1	IVC2	4.7438	8.8948	30
POSITION	1	Co Cmdr	4.3940	6.6194	4
POSITION	2	Plt Ldrs	5.6165	5.8584	13
POSITION	3	Other TCs	3.9788	12.0178	13
GRP	2	CVC2	8.6040	11.1643	22
POSITION	1	Co Cmdr	22.0454	.0000	1
POSITION	2	Plt Ldrs	12.9751	9.1195	9
POSITION	3	Other TCs	4.2055	11.1492	12
GRP	3	M1 Base	.3511	8.2240	24
POSITION	1	Co Cmdr	-.7667	9.8033	3
POSITION	2	Plt Ldrs	.8688	11.2576	11
POSITION	3	Other TCs	.1170	3.1409	10

Total Cases = 91
Missing Cases = 15 OR 16.5 PCT.

Prepare/Send Spot Report

**** MULTIPLE REGRESSION ****

Equation Number 1 Dependent Variable.. T1WL

Beginning Block Number 1. Method: Stepwise

Step	MultR	Rsq	AdjRsq	F(Eqn)	SigF	RsqCh	FCh	SigCh		Variable	BetaIn	Correl
1	.8480	.7191	.7137	133.136	.000	.7191	133.136	.000	In:	CMT1WL5	.8480	.8480
2	.9265	.8585	.8529	154.691	.000	.1394	50.222	.000	In:	CMT1WL3	.4577	.7952
3	.9613	.9241	.9196	202.961	.000	.0656	43.243	.000	In:	CMT1WL1	.2952	.6530

Variable(s) Entered on Step Number 3.. CMT1WL1

Multiple R	.96131
R Square	.92411
Adjusted R Square	.91956
Standard Error	4.73739

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	3	13665.11380	4555.03793
Residual	50	1122.14546	22.44291

F = 202.96112 Signif F = .0000

Listwise Deletion of Missing Data

N of Cases = 54

Correlation:

	T1WL	CMT1WL1	CMT1WL2	CMT1WL3	CMT1WL5	CMT1WL6
T1WL	1.000	.653	.649	.795	.848	.799
CMT1WL1	.653	1.000	.519	.309	.496	.253
CMT1WL2	.649	.519	1.000	.395	.493	.270
CMT1WL3	.795	.309	.395	1.000	.579	.644
CMT1WL5	.848	.496	.493	.579	1.000	.622
CMT1WL6	.799	.253	.270	.644	.622	1.000

Mental Demand: Task 1 - Prepare/Send SPOT Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	642.15	68	9.44		
CONSTANT	98.32	1	98.32	10.41	.002
GRP(1)	11.39	1	11.39	1.21	.276
GRP(2)	26.57	1	26.57	2.81	.098
POSITION	107.81	2	53.90	5.71	.005
GRP(1) BY POSITION	7.62	2	3.81	.40	.669
GRP(2) BY POSITION	19.19	2	9.60	1.02	.367

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	384.82	68	5.66		
SCENARIO	1.18	1	1.18	.21	.650
GRP(1) BY SCENARIO	3.26	1	3.26	.58	.450
GRP(2) BY SCENARIO	.47	1	.47	.08	.773
POSITION BY SCENARIO	19.95	2	9.98	1.76	.179
GRP(1) BY POSITION BY SCENARIO	3.05	2	1.53	.27	.764
GRP(2) BY POSITION BY SCENARIO	20.38	2	10.19	1.80	.173

"Mental Demand: Task 1 - Prepare/Send SPOT Report".

Cell Means and Standard Deviations
Variable .. T1DFMD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	.855	3.852	4	-5.274	6.984
POSITION	Plt Ldrs	1.355	2.496	13	-.153	2.864
POSITION	Other TC	.280	3.129	13	-1.611	2.171
GRP	CVC2					
POSITION	Co Cmdr	3.450	.000	1		
POSITION	Plt Ldrs	3.196	2.863	10	1.148	5.244
POSITION	Other TC	.460	2.268	12	-.981	1.901
GRP	M1 Base					
POSITION	Co Cmdr	.440	5.146	3	-12.345	13.225
POSITION	Plt Ldrs	.204	3.298	11	-2.012	2.419
POSITION	Other TC	1.063	2.161	10	-.483	2.609
For entire sample		1.036	2.913	77	.375	1.698

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Variable .. T1OFMD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	2.577	1.712	4	-.146	5.301
POSITION	Plt Ldrs	1.440	2.121	13	.158	2.722
POSITION	Other TC	-.549	3.255	13	-2.516	1.418
GRP	CVC2					
POSITION	Co Cmdr	3.250	.000	1		
POSITION	Plt Ldrs	1.995	2.788	10	.001	3.989
POSITION	Other TC	-.379	2.450	12	-1.936	1.177
GRP	M1 Base					
POSITION	Co Cmdr	.647	1.951	3	-4.201	5.494
POSITION	Plt Ldrs	1.388	1.879	11	.126	2.651
POSITION	Other TC	-1.296	3.115	10	-3.524	.932
For entire sample		.582	2.760	77	-.045	1.208

Mental Demand: Task 1 - Prepare/Send SPOT Report

Summaries of T1AVMD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.8090	2.2789	77
GRP	1	IVC2	.7762	2.5414	30
GRP	2	CVC2	1.2952	2.4684	23
GRP	3	M1 Base	.3842	1.6621	24

Total Cases = 91
Missing Cases = 14 OR 15.4 PCT.

Summaries of T1AVMD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.8090	2.2789	77
POSITION	1	Co Cmdr	1.4806	2.5560	8
POSITION	2	Plt Ldrs	1.5553	1.8865	34
POSITION	3	Other TCs	-.0694	2.3134	35

Total Cases = 91
Missing Cases = 14 OR 15.4 PCT.

Summaries of T1AVMD
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.8090	2.2789	77
GRP	1	IVC2	.7762	2.5414	30
POSITION	1	Co Cmdr	1.7163	2.4516	4
POSITION	2	Plt Ldrs	1.3977	1.7443	13
POSITION	3	Other TCs	-.1346	3.0744	13
GRP	2	CVC2	1.2952	2.4684	23
POSITION	1	Co Cmdr	3.3500	.0000	1
POSITION	2	Plt Ldrs	2.5955	2.2605	10
POSITION	3	Other TCs	.0404	2.0895	12
GRP	3	M1 Base	.3842	1.6621	24
POSITION	1	Co Cmdr	.5433	3.2672	3
POSITION	2	Plt Ldrs	.7959	1.3211	11
POSITION	3	Other TCs	-.1165	1.5016	10

Total Cases = 91
Missing Cases = 14 OR 15.4 PCT.

Physical Demand: Task 1 - Prepare/Send SPOT Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	415.75	68	6.11		
CONSTANT	2.73	1	2.73	.45	.506
GRP(1)	16.55	1	16.55	2.71	.105
GRP(2)	72.28	1	72.28	11.82	.001
POSITION	3.14	2	1.57	.26	.774
GRP(1) BY POSITION	44.20	2	22.10	3.61	.032
GRP(2) BY POSITION	50.29	2	25.15	4.11	.021

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	128.42	68	1.89		
SCENARIO	3.70	1	3.70	1.96	.166
GRP(1) BY SCENARIO	1.23	1	1.23	.65	.423
GRP(2) BY SCENARIO	.70	1	.70	.37	.545
POSITION BY SCENARIO	2.77	2	1.39	.73	.484
GRP(1) BY POSITION BY SCENARIO	2.04	2	1.02	.54	.585
GRP(2) BY POSITION BY SCENARIO	6.77	2	3.39	1.79	.174

"Physical Demand: Task 1 - Prepare/Send SPOT Report".

Cell Means and Standard Deviations
Variable .. T1DFPD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-.505	1.771	4	-3.322	2.312
POSITION	Plt Ldrs	1.077	1.744	13	.019	2.126
POSITION	Other TC	1.260	2.838	13	-.455	2.975
GRP	CVC2					
POSITION	Co Cmdr	2.820	.000	1		
POSITION	Plt Ldrs	1.795	1.780	10	.522	3.068
POSITION	Other TC	-.150	1.417	12	-1.050	.750
GRP	MI Base					
POSITION	Co Cmdr	-2.743	.403	3	-3.744	-1.743
POSITION	Plt Ldrs	-.337	3.033	11	-2.375	1.701
POSITION	Other TC	.463	1.183	10	-.383	1.309
For entire sample		.519	2.237	77	.011	1.027

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Variable .. T1DFPD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-1.000	1.823	4	-3.901	1.901
POSITION	Plt Ldrs	.142	.927	13	-.418	.702
POSITION	Other TC	.568	2.502	13	-.944	2.079
GRP	CVC2					
POSITION	Co Cmdr	3.830	.000	1		
POSITION	Plt Ldrs	.603	1.444	10	-.430	1.636
POSITION	Other TC	-.113	1.755	12	-1.228	1.002
GRP	MI Base					
POSITION	Co Cmdr	-3.593	1.980	3	-7.513	2.326
POSITION	Plt Ldrs	-.754	2.909	11	-2.708	1.200
POSITION	Other TC	-.963	.793	10	-1.529	-.395
For entire sample		-.155	2.009	77	-.611	.301

Physical Demand: Task 1 - Prepare/Send SPOT Report

Summaries of T1AVPD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.1818	1.8992	77
GRP	1	IVC2	.5588	1.8007	30
GRP	2	CVC2	.5972	1.4918	23
GRP	3	M1 Base	-.6875	2.1344	24

Total Cases = 91
Missing Cases = 14 OR 15.4 PCT.

Summaries of T1AVPD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.1818	1.8992	77
POSITION	1	Co Cmdr	-.9613	2.3431	8
POSITION	2	Plt Ldrs	.4084	1.9987	34
POSITION	3	Other TCs	.2230	1.6416	35

Total Cases = 91
Missing Cases = 14 OR 15.4 PCT.

Summaries of T1AVPD
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.1818	1.8992	77
GRP	1	IVC2	.5588	1.8007	30
POSITION	1	Co Cmdr	-.7525	1.6738	4
POSITION	2	Plt Ldrs	.6073	1.1128	13
POSITION	3	Other TCs	.9138	2.2771	13
GRP	2	CVC2	.5972	1.4918	23
POSITION	1	Co Cmdr	3.3250	.0000	1
POSITION	2	Plt Ldrs	1.1990	1.4211	10
POSITION	3	Other TCs	-.1317	1.1016	12
GRP	3	M1 Base	-.6875	2.1344	24
POSITION	1	Co Cmdr	-2.6683	1.1699	3
POSITION	2	Plt Ldrs	-.5455	2.8640	11
POSITION	3	Other TCs	-.2495	.8234	10

Total Cases = 91
Missing Cases = 14 OR 15.4 PCT.

Time Demand: Task 1 - Prepare/Send SPOT Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	1210.24	68	17.80		
CONSTANT	242.96	1	242.96	13.65	.000
GRP(1)	77.29	1	77.29	4.34	.041
GRP(2)	102.11	1	102.11	5.74	.019
POSITION	16.51	2	8.25	.46	.631
GRP(1) BY POSITION	27.05	2	13.53	.76	.472
GRP(2) BY POSITION	48.34	2	24.17	1.36	.264

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	429.60	68	6.32		
SCENARIO	1.41	1	1.41	.22	.638
GRP(1) BY SCENARIO	.09	1	.09	.01	.903
GRP(2) BY SCENARIO	4.01	1	4.01	.63	.429
POSITION BY SCENARIO	21.43	2	10.72	1.70	.191
GRP(1) BY POSITION BY SCENARIO	1.06	2	.53	.08	.919
GRP(2) BY POSITION BY SCENARIO	5.94	2	2.97	.47	.627

"Time Demand: Task 1 - Prepare/Send SPOT Report".

Cell Means and Standard Deviations
Variable .. T1DFTD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	1.288	2.125	4	-2.093	4.668
POSITION	Plt Ldrs	.922	2.875	13	-.816	2.659
POSITION	Other TC	1.412	3.639	13	-.787	3.611
GRP	CVC2					
POSITION	Co Cmdr	5.180	.000	1		
POSITION	Plt Ldrs	3.853	4.086	10	.930	6.776
POSITION	Other TC	2.147	4.443	12	-.676	4.971
GRP	M1 Base					
POSITION	Co Cmdr	-1.590	1.311	3	-4.846	1.666
POSITION	Plt Ldrs	-.010	4.105	11	-2.768	2.748
POSITION	Other TC	1.594	3.737	10	-1.079	4.267
For entire sample		1.507	3.750	77	.656	2.358

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Variable .. T1OFTD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	1.627	3.520	4	-3.974	7.229
POSITION	Plt Ldrs	.909	2.832	13	-.802	2.620
POSITION	Other TC	.301	3.746	13	-1.963	2.565
GRP	CVC2					
POSITION	Co Cmdr	6.000	.000	1		
POSITION	Plt Ldrs	3.464	3.121	10	1.232	5.696
POSITION	Other TC	1.478	4.306	12	-1.257	4.214
GRP	M1 Base					
POSITION	Co Cmdr	2.133	2.723	3	-4.631	8.897
POSITION	Plt Ldrs	.833	2.303	11	-.714	2.380
POSITION	Other TC	.489	2.160	10	-1.056	2.034
For entire sample		1.313	3.242	77	.577	2.049

Time Demand: Task 1 - Prepare/Send SPOT Report

Summaries of T1AVTD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			1.4097	3.0316	77
GRP	1	IVC2	.9622	2.7537	30
GRP	2	CVC2	2.7796	3.6116	23
GRP	3	M1 Base	.6565	2.3668	24

Total Cases = 91
Missing Cases = 14 OR 15.4 PCT.

Summaries of T1AVTD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			1.4097	3.0316	77
POSITION	1	Co Cmdr	1.5294	2.5643	8
POSITION	2	Plt Ldrs	1.5591	3.1779	34
POSITION	3	Other TCs	1.2373	3.1526	35

Total Cases = 91
Missing Cases = 14 OR 15.4 PCT.

Summaries of T1AVTD
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			1.4097	3.0316	77
GRP	1	IVC2	.9622	2.7537	30
POSITION	1	Co Cmdr	1.4575	2.7737	4
POSITION	2	Plt Ldrs	.9154	2.4190	13
POSITION	3	Other TCs	.8565	3.2339	13
GRP	2	CVC2	2.7796	3.6116	23
POSITION	1	Co Cmdr	5.5900	.0000	1
POSITION	2	Plt Ldrs	3.6585	3.2467	10
POSITION	3	Other TCs	1.8129	3.8759	12
GRP	3	M1 Base	.6565	2.3668	24
POSITION	1	Co Cmdr	.2717	.9336	3
POSITION	2	Plt Ldrs	.4114	2.8911	11
POSITION	3	Other TCs	1.0415	2.1324	10

Total Cases = 91
Missing Cases = 14 OR 15.4 PCT.

Effort: Task 1 - Prepare/Send SPOT Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	703.59	68	10.35		
CONSTANT	83.39	1	83.39	8.06	.006
GRP(1)	22.00	1	22.00	2.13	.149
GRP(2)	68.07	1	68.07	6.58	.013
POSITION	10.97	2	5.49	.53	.591
GRP(1) BY POSITION	26.07	2	13.03	1.26	.290
GRP(2) BY POSITION	23.43	2	11.71	1.13	.328

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	461.49	68	6.79		
SCENARIO	13.38	1	13.38	1.97	.165
GRP(1) BY SCENARIO	1.10	1	1.10	.16	.688
GRP(2) BY SCENARIO	.80	1	.80	.12	.732
POSITION BY SCENARIO	8.98	2	4.49	.66	.519
GRP(1) BY POSITION BY SCENARIO	8.65	2	4.33	.64	.532
GRP(2) BY POSITION BY SCENARIO	1.82	2	.91	.13	.875

Physical Demand: Task 1 - Prepare/Send SPOT Report

Cell Means and Standard Deviations

Variable .. T1DFEF

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	.893	2.067	4	-2.397	4.182
POSITION	Plt Ldrs	1.162	1.647	13	.167	2.157
POSITION	Other TC	1.733	3.600	13	-.442	3.908
GRP	CVC2					
POSITION	Co Cmdr	5.640	.000	1		
POSITION	Plt Ldrs	2.397	2.512	10	.600	4.194
POSITION	Other TC	.866	2.022	12	-.419	2.150
GRP	M1 Base					
POSITION	Co Cmdr	1.090	4.869	3	-11.005	13.185
POSITION	Plt Ldrs	.093	3.801	11	-2.461	2.647
POSITION	Other TC	-.732	4.639	10	-4.050	2.586
For entire sample		1.015	3.195	77	.290	1.741

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Variable .. T1OFEF

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	.515	2.484	4	-3.437	4.467
POSITION	Plt Ldrs	.998	2.260	13	-.367	2.364
POSITION	Other TC	.465	2.802	13	-1.229	2.158
GRP	CVC2					
POSITION	Co Cmdr	3.420	.000	1		
POSITION	Plt Ldrs	1.107	2.985	10	-1.028	3.242
POSITION	Other TC	.693	3.289	12	-1.396	2.783
GRP	M1 Base					
POSITION	Co Cmdr	-1.937	.601	3	-3.428	-.445
POSITION	Plt Ldrs	-.224	1.647	11	-1.330	.883
POSITION	Other TC	.586	2.904	10	-1.491	2.663
For entire sample		.539	2.606	77	-.053	1.130

Effort: Task 1 - Prepare/Send SPOT Report

Summaries of T1AVEF
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7770	2.2864	77
GRP	1	IVC2	1.0382	2.0056	30
GRP	2	CVC2	1.3654	2.5479	23
GRP	3	M1 Base	-.1133	2.1749	24

Total Cases = 91
Missing Cases = 14 OR 15.4 PCT.

Summaries of T1AVEF
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7770	2.2864	77
POSITION	1	Co Cmdr	.7594	2.5629	8
POSITION	2	Plt Ldrs	.9072	2.2906	34
POSITION	3	Other TCs	.6546	2.2821	35

Total Cases = 91
Missing Cases = 14 OR 15.4 PCT.

Frustration: Task 1 - Prepare/Send SPOT Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	1041.74	68	15.32		
CONSTANT	251.45	1	251.45	16.41	.000
GRP(1)	46.04	1	46.04	3.01	.088
GRP(2)	82.03	1	82.03	5.35	.024
POSITION	64.16	2	32.08	2.09	.131
GRP(1) BY POSITION	28.43	2	14.21	.93	.400
GRP(2) BY POSITION	5.80	2	2.90	.19	.828

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	438.95	68	6.46		
SCENARIO	12.65	1	12.65	1.96	.166
GRP(1) BY SCENARIO	4.04	1	4.04	.63	.432
GRP(2) BY SCENARIO	5.44	1	5.44	.84	.362
POSITION BY SCENARIO	8.71	2	4.36	.67	.513
GRP(1) BY POSITION B Y SCENARIO	49.58	2	24.79	3.84	.026
GRP(2) BY POSITION B Y SCENARIO	95.37	2	47.68	7.39	.001

subtitle "Frustration: Task 1 - Prepare/Send SPOT Report".

Cell Means and Standard Deviations
Variable .. T1DFFR

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	.365	1.993	4	-2.807	3.537
POSITION	Plt Ldrs	1.205	2.507	13	-.310	2.720
POSITION	Other TC	1.928	2.575	13	.371	3.484
GRP	CVC2					
POSITION	Co Cadr	5.730	.000	1		
POSITION	Plt Ldrs	4.176	3.661	10	1.557	6.795
POSITION	Other TC	1.426	4.147	12	-1.209	4.060
GRP	M1 Base					
POSITION	Co Cadr	4.333	5.565	3	-9.491	18.157
POSITION	Plt Ldrs	-.305	3.523	11	-2.672	2.061
POSITION	Other TC	1.091	2.361	10	-.598	2.780
For entire sample		1.654	3.385	77	.885	2.422

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Variable .. T1OFFR

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	2.427	3.306	4	-2.833	7.688
POSITION	Plt Ldrs	1.968	3.335	13	-.047	3.984
POSITION	Other TC	.488	3.123	13	-1.399	2.376
GRP	CVC2					
POSITION	Co Cadr	6.670	.000	1		
POSITION	Plt Ldrs	.820	3.106	10	-1.402	3.042
POSITION	Other TC	1.649	4.219	12	-1.032	4.330
GRP	M1 Base					
POSITION	Co Cadr	-.170	4.791	3	-12.073	11.733
POSITION	Plt Ldrs	.846	3.123	11	-1.252	2.945
POSITION	Other TC	-2.062	2.547	10	-3.884	-.240
For entire sample		.838	3.489	77	.046	1.629

Frustration: Task 1 - Prepare/Send SPOT Report

Summaries of T1AVFR
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			1.2456	2.8244	77
GRP	1	IVC2	1.3972	2.0986	30
GRP	2	CVC2	2.1578	3.5335	23
GRP	3	M1 Base	.1819	2.6117	24

Total Cases = 91
Missing Cases = 14 OR 15.4 PCT.

Summaries of T1AVFR
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			1.2456	2.8244	77
POSITION	1	Co Cmdr	2.2538	3.1490	8
POSITION	2	Plt Ldrs	1.4288	2.8025	34
POSITION	3	Other TCs	.8371	2.7789	35

Total Cases = 91
Missing Cases = 14 OR 15.4 PCT.

Appendix F2
Prepare/Send Contact Report

Variable or term	Description
GRP(1)	ANOVA factor comparing CVCC with M1 Baseline
GRP(2)	ANOVA factor comparing CVCC with IVCC
T3DFDVN	Total workload deviation score for defensive scenario
T3OFDVN	Total workload deviation score for offensive scenario
TSK3DVN	Total workload deviation score--mean across scenarios
T3DFMD	Mental Demand subscale deviation score for defensive scenario
T3OFMD	Mental Demand subscale deviation score for offensive scenario
T3AVMD	Mental Demand subscale deviation score--mean across scenarios
T3DFPD	Physical Demand subscale deviation score for defensive scenario
T3OFPD	Physical Demand subscale deviation score for offensive scenario
T3AVPD	Physical Demand subscale deviation score--mean across scenarios
T3DFTD	Time Demand subscale deviation score for defensive scenario
T3OFTD	Time Demand subscale deviation score for offensive scenario
T3AVTD	Time Demand subscale deviation score--mean across scenarios
T3DFEF	Effort subscale deviation score for defensive scenario
T3OFEF	Effort subscale deviation score for offensive scenario
T3AVEF	Effort subscale deviation score--mean across scenarios
T3DFFR	Frustration subscale deviation score for defensive scenario
T3OFFR	Frustration subscale deviation score for offensive scenario
T3AVFR	Frustration subscale deviation score--mean across scenarios

Multiple Regression variable	Description
T3WL	Total workload rating for task
CMT3WL1	Mental Demand subscale score for task
CMT3WL2	Physical Demand subscale score for task
CMT3WL3	Time Demand subscale score for task
CMT3WL5	Effort subscale score for task
CMT3WL6	Frustration subscale score for task

Deviation Scores: Task 3 - Prepare/Send CONTACT Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	26291.16	67	392.41		
CONSTANT	51.34	1	51.34	.13	.719
GRP(1)	2849.69	1	2849.69	7.26	.009
GRP(2)	2773.52	1	2773.52	7.07	.010
POSITION	18.34	2	9.17	.02	.977
GRP(1) BY POSITION	1108.74	2	554.37	1.41	.251
GRP(2) BY POSITION	618.81	2	309.40	.79	.459

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	5457.41	67	81.45		
SCENARIO	27.61	1	27.61	.34	.562
GRP(1) BY SCENARIO	194.48	1	194.48	2.39	.127
GRP(2) BY SCENARIO	80.60	1	80.60	.99	.323
POSITION BY SCENARIO	261.52	2	130.76	1.61	.208
GRP(1) BY POSITION BY SCENARIO	157.23	2	78.61	.97	.386
GRP(2) BY POSITION BY SCENARIO	172.26	2	86.13	1.06	.353

Deviation Scores:

Cell Means and Standard Deviations
Variable .. T3DFDVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-14.851	12.361	4	-34.520	4.817
POSITION	Plt Ldrs	-6.538	16.862	13	-16.728	3.652
POSITION	Other TC	-.239	13.137	13	-8.178	7.700
GRP	CVC2					
POSITION	Co Cmdr	26.818	.000	1		
POSITION	Plt Ldrs	7.362	14.221	13	-1.232	15.955
POSITION	Other TC	4.259	20.084	9	-11.178	19.697
GRP	M1 Base					
POSITION	Co Cmdr	-4.985	23.616	3	-63.652	53.683
POSITION	Plt Ldrs	-7.901	16.559	11	-19.025	3.224
POSITION	Other TC	-5.897	9.414	9	-13.132	1.339
For entire sample		-1.863	16.329	76	-5.594	1.868

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Variable .. T3OFDVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-12.861	10.988	4	-30.345	4.624
POSITION	Plt Ldrs	-.383	12.722	13	-8.071	7.305
POSITION	Other TC	-.964	16.370	13	-10.856	8.928
GRP	CVC2					
POSITION	Co Cmdr	7.273	.000	1		
POSITION	Plt Ldrs	10.440	17.367	13	-.055	20.935
POSITION	Other TC	3.264	17.601	9	-10.266	16.793
GRP	M1 Base					
POSITION	Co Cmdr	-9.216	22.464	3	-65.020	46.589
POSITION	Plt Ldrs	-8.362	12.586	11	-16.817	.094
POSITION	Other TC	-1.999	13.114	9	-12.079	8.081
For entire sample		-.450	15.863	76	-4.075	3.175

Deviation Scores: Task 3 - Prepare/Send CONTACT Report

Summaries of TSK3DVN
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-1.1565	14.8049	76
GRP	1	IVC2	-3.6076	13.4934	30
GRP	2	CVC2	7.2438	15.2831	23
GRP	3	M1 Base	-6.3598	12.7816	23

Total Cases = 91
Missing Cases = 15 OR 16.5 PCT.

Summaries of TSK3DVN
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-1.1565	14.8049	76
GRP	1	IVC2	-3.6076	13.4934	30
POSITION	1	Co Cmdr	-13.8560	11.5653	4
POSITION	2	Plt Ldrs	-3.4604	13.5012	13
POSITION	3	Other TCs	-.6014	13.3963	13
GRP	2	CVC2	7.2438	15.2831	23
POSITION	1	Co Cmdr	17.0454	.0000	1
POSITION	2	Plt Ldrs	8.9006	13.7342	13
POSITION	3	Other TCs	3.7617	18.1460	9
GRP	3	M1 Base	-6.3598	12.7816	23
POSITION	1	Co Cmdr	-7.1000	22.4983	3
POSITION	2	Plt Ldrs	-8.1312	13.6176	11
POSITION	3	Other TCs	-3.9480	8.9366	9

Total Cases = 91
Missing Cases = 15 OR 16.5 PCT.

Prepare/Send Contact Report

**** MULTIPLE REGRESSION ****

Equation Number 1 Dependent Variable.. T3WL

Beginning Block Number 1. Method: Stepwise

Step	MultR	Rsq	AdjRsq	F(Eqn)	SigF	RsqCh	FCh	SigCh		Variable	BetaIn	Correl
1	.8597	.7391	.7341	147.290	.000	.7391	147.290	.000	In:	CMT3WL6	.8597	.8597
2	.9428	.8889	.8846	204.038	.000	.1498	68.785	.000	In:	CMT3WL1	.4445	.7598
3	.9740	.9486	.9455	307.766	.000	.0597	58.126	.000	In:	CMT3WL5	.3340	.8067

Variable(s) Entered on Step Number 3.. CMT3WL5

Multiple R	.97398
R Square	.94863
Adjusted R Square	.94555
Standard Error	4.74323

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	3	20772.56892	6924.18964
Residual	50	1124.91257	22.49825

F = 307.76568 Signif F = .0000

Listwise Deletion of Missing Data

N of Cases = 54

Correlation:

	T3WL	CMT3WL1	CMT3WL2	CMT3WL3	CMT3WL5	CMT3WL6
T3WL	1.000	.760	.552	.833	.807	.860
CMT3WL1	.760	1.000	.552	.514	.451	.492
CMT3WL2	.552	.552	1.000	.255	.346	.271
CMT3WL3	.833	.514	.255	1.000	.590	.707
CMT3WL5	.807	.451	.346	.590	1.000	.667
CMT3WL6	.860	.492	.271	.707	.667	1.000

Mental Demand: Task 3 - Prepare/Send CONTACT Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	1515.34	67	22.62		
CONSTANT	81.29	1	81.29	3.59	.062
GRP(1)	107.03	1	107.03	4.73	.033
GRP(2)	87.04	1	87.04	3.85	.054
POSITION	1.96	2	.98	.04	.958
GRP(1) BY POSITION	104.04	2	52.02	2.30	.108
GRP(2) BY POSITION	52.92	2	26.46	1.17	.317

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	314.40	67	4.69		
SCENARIO	.02	1	.02	.00	.953
GRP(1) BY SCENARIO	3.38	1	3.38	.72	.399
GRP(2) BY SCENARIO	2.00	1	2.00	.43	.517
POSITION BY SCENARIO	3.19	2	1.60	.34	.713
GRP(1) BY POSITION B Y SCENARIO	10.15	2	5.08	1.08	.345
GRP(2) BY POSITION B Y SCENARIO	4.40	2	2.20	.47	.628

"Mental Demand: Task 3 - Prepare/Send CONTACT Report".

Cell Means and Standard Deviations
Variable .. T3DFMD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-4.645	3.266	4	-9.842	.552
POSITION	Plt Ldrs	-2.029	5.011	13	-5.057	.999
POSITION	Other TC	-.393	3.062	13	-2.244	1.457
GRP	CVC2					
POSITION	Co Cmdr	4.450	.000	1		
POSITION	Plt Ldrs	.577	4.318	13	-2.032	3.186
POSITION	Other TC	-1.223	3.605	9	-3.994	1.547
GRP	M1 Base					
POSITION	Co Cmdr	-2.560	.340	3	-3.406	-1.714
POSITION	Plt Ldrs	-1.615	2.867	11	-3.541	.312
POSITION	Other TC	-1.993	3.326	9	-4.550	.563
For entire sample		-1.217	3.822	76	-2.091	-.344

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Variable .. T3OFMD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-4.422	3.701	4	-10.311	1.466
POSITION	Plt Ldrs	-.406	3.941	13	-2.788	1.976
POSITION	Other TC	-.836	3.469	13	-2.932	1.260
GRP	CVC2					
POSITION	Co Cmdr	2.250	.000	1		
POSITION	Plt Ldrs	.541	2.546	13	-.998	2.079
POSITION	Other TC	-.867	3.474	9	-3.537	1.804
GRP	M1 Base					
POSITION	Co Cmdr	-2.687	4.036	3	-12.712	7.339
POSITION	Plt Ldrs	-2.157	3.696	11	-4.640	.326
POSITION	Other TC	-.581	4.608	9	-4.123	2.961
For entire sample		-.913	3.657	76	-1.749	-.077

Mental Demand: Task 3 - Prepare/Send CONTACT Report

Summaries of T3AVMD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-1.0651	3.4208	76
GRP	1	IVC2	-1.3985	3.7340	30
GRP	2	CVC2	.0526	3.1986	23
GRP	3	M1 Base	-1.7478	3.0559	23

Total Cases = 91
Missing Cases = 15 OR 16.5 PCT.

Summaries of T3AVMD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-1.0651	3.4208	76
POSITION	1	Co Cadr	-2.8319	3.6613	8
POSITION	2	Plt Ldrs	-.7922	3.5113	37
POSITION	3	Other TCs	-.9348	3.2234	31

Total Cases = 91
Missing Cases = 15 OR 16.5 PCT.

Summaries of T3AVMD
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-1.0651	3.4208	76
GRP	1	IVC2	-1.3985	3.7340	30
POSITION	1	Co Cadr	-4.5337	3.4515	4
POSITION	2	Plt Ldrs	-1.2177	4.0714	13
POSITION	3	Other TCs	-.6146	3.1879	13
GRP	2	CVC2	.0526	3.1986	23
POSITION	1	Co Cadr	3.3500	.0000	1
POSITION	2	Plt Ldrs	.5588	2.9994	13
POSITION	3	Other TCs	-1.0450	3.3925	9
GRP	3	M1 Base	-1.7478	3.0559	23
POSITION	1	Co Cadr	-2.6233	2.0205	3
POSITION	2	Plt Ldrs	-1.8859	3.1263	11
POSITION	3	Other TCs	-1.2872	3.4484	9

Total Cases = 91
Missing Cases = 15 OR 16.5 PCT.

Physical Demand: Task 3 - Prepare/Send CONTACT Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	638.22	67	9.53		
CONSTANT	24.17	1	24.17	2.54	.116
GRP(1)	63.05	1	63.05	6.62	.012
GRP(2)	89.02	1	89.02	9.35	.003
POSITION	14.03	2	7.01	.74	.483
GRP(1) BY POSITION	47.80	2	23.90	2.51	.089
GRP(2) BY POSITION	60.75	2	30.37	3.19	.048

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	273.28	67	4.08		
SCENARIO	.02	1	.02	.00	.946
GRP(1) BY SCENARIO	1.67	1	1.67	.41	.525
GRP(2) BY SCENARIO	.54	1	.54	.13	.717
POSITION BY SCENARIO	1.74	2	.87	.21	.808
GRP(1) BY POSITION B Y SCENARIO	10.62	2	5.31	1.30	.279
GRP(2) BY POSITION B Y SCENARIO	1.12	2	.56	.14	.872

'Physical Demand: Task 3 - Prepare/Send CONTACT Report'.

Cell Means and Standard Deviations
Variable .. T3DFPD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-2.505	3.776	4	-8.517	3.507
POSITION	Plt Ldrs	-1.697	3.761	13	-3.970	.576
POSITION	Other TC	.215	3.058	13	-1.633	2.063
GRP	CVC2					
POSITION	Co Cadr	3.820	.000	1		
POSITION	Plt Ldrs	.524	1.477	13	-.368	1.416
POSITION	Other TC	-.094	1.246	9	-1.052	.863
GRP	M1 Base					
POSITION	Co Cadr	-3.410	1.459	3	-7.035	.215
POSITION	Plt Ldrs	-1.519	2.643	11	-3.295	.256
POSITION	Other TC	-.263	3.107	9	-2.651	2.125
For entire sample		-.642	2.888	76	-1.302	.018

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Variable .. T3DFPD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-2.500	2.018	4	-5.710	.710
POSITION	Plt Ldrs	-.012	2.719	13	-1.654	1.631
POSITION	Other TC	-.488	2.709	13	-2.126	1.149
GRP	CVC2					
POSITION	Co Cadr	2.830	.000	1		
POSITION	Plt Ldrs	.208	2.843	13	-1.510	1.927
POSITION	Other TC	-.107	1.007	9	-.881	.667
GRP	M1 Base					
POSITION	Co Cadr	-2.927	1.154	3	-5.793	-.060
POSITION	Plt Ldrs	-2.117	3.044	11	-4.162	-.072
POSITION	Other TC	-.099	.958	9	-.835	.637
For entire sample		-.591	2.535	76	-1.170	-.011

Physical Demand: Task 3 - Prepare/Send CONTACT Report

Summaries of T3AVPD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.6164	2.3229	76
GRP	1	IVC2	-.7633	2.6194	30
GRP	2	CVC2	.3174	1.4588	23
GRP	3	M1 Base	-1.3522	2.3922	23

Total Cases = 91
Missing Cases = 15 OR 16.5 PCT.

Summaries of T3AVPD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.6164	2.3229	76
POSITION	1	Co Cadr	-2.0277	2.8979	8
POSITION	2	Plt Ldrs	-.7123	2.5456	37
POSITION	3	Other TCs	-.1391	1.7259	31

Total Cases = 91
Missing Cases = 15 OR 16.5 PCT.

Summaries of T3AVPD
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.6164	2.3229	76
GRP	1	IVC2	-.7630	2.6194	30
POSITION	1	Co Cadr	-2.5125	2.8466	4
POSITION	2	Plt Ldrs	-.8542	2.8476	13
POSITION	3	Other TCs	-.3365	2.2369	13
GRP	2	CVC2	.3174	1.4588	23
POSITION	1	Co Cadr	3.0250	.0000	1
POSITION	2	Plt Ldrs	.3692	1.5596	13
POSITION	3	Other TCs	-.3306	.9342	9
GRP	3	M1 Base	-1.3522	2.3922	23
POSITION	1	Co Cadr	-3.1283	.7132	3
POSITION	2	Plt Ldrs	-1.8182	2.7920	11
POSITION	3	Other TCs	-.3311	1.6698	9

Total Cases = 91
Missing Cases = 15 OR 16.5 PCT.

Time Demand: Task 3 - Prepare/Send CONTACT Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	2548.08	67	38.03		
CONSTANT	.96	1	.96	.03	.874
GRP(1)	169.88	1	169.88	4.47	.038
GRP(2)	186.21	1	186.21	4.90	.030
POSITION	1.83	2	.91	.02	.976
GRP(1) BY POSITION	57.72	2	28.86	.76	.472
GRP(2) BY POSITION	2.53	2	1.27	.03	.967

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	574.65	67	8.58		
SCENARIO	.11	1	.11	.01	.912
GRP(1) BY SCENARIO	10.92	1	10.92	1.27	.263
GRP(2) BY SCENARIO	19.50	1	19.50	2.27	.136
POSITION BY SCENARIO	18.75	2	9.37	1.09	.341
GRP(1) BY POSITION BY SCENARIO	22.76	2	11.38	1.33	.272
GRP(2) BY POSITION BY SCENARIO	33.77	2	16.88	1.97	.148

"Time Demand: Task 3 - Prepare/Send CONTACT Report".

Cell Means and Standard Deviations
Variable .. T3DFTD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-3.962	5.253	4	-12.321	4.396
POSITION	Plt Ldrs	.075	5.140	13	-3.031	3.181
POSITION	Other TC	-.017	3.453	13	-2.103	2.070
GRP	CVC2					
POSITION	Co Cmdr	7.180	.000	1		
POSITION	Plt Ldrs	1.394	4.061	13	-1.060	3.848
POSITION	Other TC	2.099	7.773	9	-3.876	8.074
GRP	M1 Base					
POSITION	Co Cmdr	-1.257	9.877	3	-25.792	23.279
POSITION	Plt Ldrs	-2.465	3.908	11	-5.090	.161
POSITION	Other TC	-2.372	2.340	9	-4.171	-.574
For entire sample		-.304	5.047	76	-1.458	.849

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Variable .. T3OFTD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-3.872	3.890	4	-10.062	2.317
POSITION	Plt Ldrs	.909	4.353	13	-1.722	3.540
POSITION	Other TC	.482	5.186	13	-2.652	3.616
GRP	CVC2					
POSITION	Co Cmdr	1.000	.000	1		
POSITION	Plt Ldrs	3.478	5.132	13	.377	6.580
POSITION	Other TC	1.720	5.888	9	-2.806	6.246
GRP	M1 Base					
POSITION	Co Cmdr	.800	5.692	3	-13.340	14.940
POSITION	Plt Ldrs	-1.713	3.614	11	-4.141	.715
POSITION	Other TC	-1.457	3.913	9	-4.465	1.551
For entire sample		.457	4.903	76	-.663	1.578

Time Demand: Task 3 - Prepare/Send CONTACT Report

Summaries of T3AVTD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.0764	4.5412	76
GRP	1	IVC	-.2082	4.3963	30
GRP	2	CVC	2.3020	4.7662	23
GRP	3	M1 Base	-1.7778	3.6368	23

Total Cases = 91
Missing Cases = 15 IR 16.5 PCT.

Summaries of T3AVTD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.0764	4.5412	76
POSITION	1	Co Cmdr	-1.5331	5.8007	8
POSITION	2	Plt Ldrs	.4080	4.2842	37
POSITION	3	Other TCs	.0961	4.5664	31

Total Cases = 91
Missing Cases = 15 IR 16.5 PCT.

Summaries of T3AVTD
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.0764	4.5412	76
GRP	1	IVC	-.2082	4.3963	30
POSITION	1	Co Cmdr	-3.9175	4.4240	4
POSITION	2	Plt Ldrs	.4923	4.4208	13
POSITION	3	Other TCs	.2327	4.1162	13
GRP	2	CVC	2.3020	4.7662	23
POSITION	1	Co Cmdr	4.0900	.0000	1
POSITION	2	Plt Ldrs	2.4362	3.9715	13
POSITION	3	Other TCs	1.9094	6.1813	9
GRP	3	M1 Base	-1.7778	3.6368	23
POSITION	1	Co Cmdr	-.2283	7.6601	3
POSITION	2	Plt Ldrs	-2.0886	3.3888	11
POSITION	3	Other TCs	-1.9144	2.5086	9

Total Cases = 91
Missing Cases = 15 IR 16.5 PCT.

Effort: Task 3 - Prepare/Send CONTACT Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	1447.25	67	21.60		
CONSTANT	.59	1	.59	.03	.869
GRP(1)	100.95	1	100.95	4.67	.034
GRP(2)	77.45	1	77.45	3.59	.063
POSITION	22.80	2	11.40	.53	.592
GRP(1) BY POSITION	45.19	2	22.59	1.05	.357
GRP(2) BY POSITION	48.72	2	24.36	1.13	.330

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	506.88	67	7.57		
SCENARIO	6.12	1	6.12	.81	.372
GRP(1) BY SCENARIO	2.46	1	2.46	.33	.570
GRP(2) BY SCENARIO	10.32	1	10.32	1.36	.247
POSITION BY SCENARIO	22.19	2	11.09	1.47	.238
GRP(1) BY POSITION BY SCENARIO	2.37	2	1.18	.16	.855
GRP(2) BY POSITION BY SCENARIO	3.91	2	1.96	.26	.773

"Effort: Task 3 - Prepare/Send CONTACT Report".

Cell Means and Standard Deviations
Variable .. T3DFEF

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-1.608	3.442	4	-7.085	3.870
POSITION	Plt Ldrs	-2.299	3.522	13	-4.427	-.171
POSITION	Other TC	-.158	2.857	13	-1.864	1.569
GRP	CVC2					
POSITION	Co Cadr	3.640	.000	1		
POSITION	Plt Ldrs	1.571	2.548	13	.031	3.111
POSITION	Other TC	1.088	6.134	9	-3.627	5.803
GRP	M1 Base					
POSITION	Co Cadr	2.423	7.745	3	-16.816	21.662
POSITION	Plt Ldrs	-1.816	3.809	11	-4.375	.742
POSITION	Other TC	.504	2.681	9	-1.556	2.565
For entire sample		-.167	3.955	76	-1.071	.737

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Variable .. T3OFEF

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-.235	2.748	4	-4.607	4.137
POSITION	Plt Ldrs	-1.232	3.329	13	-3.244	.779
POSITION	Other TC	-.445	3.163	13	-2.356	1.467
GRP	CVC2					
POSITION	Co Cadr	2.420	.000	1		
POSITION	Plt Ldrs	2.609	5.272	13	-.577	5.795
POSITION	Other TC	.623	4.604	9	-2.916	4.163
GRP	M1 Base					
POSITION	Co Cadr	-2.937	6.447	3	-18.951	13.078
POSITION	Plt Ldrs	-1.951	2.883	11	-3.888	-.014
POSITION	Other TC	-.611	1.779	9	-1.979	.756
For entire sample		-.218	3.930	76	-1.116	.680

Effort: Task 3 - Prepare/Send CONTACT Report

Summaries of T3AVEF
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.1924	3.4210	76
GRP	1	IVC2	-1.0185	2.7402	30
GRP	2	CVC2	1.6478	3.8960	23
GRP	3	M1 Base	-.9552	3.1210	23

Total Cases = 91
Missing Cases = 15 OR 16.5 PCT.

Summaries of T3AVEF
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.1924	3.4210	76
POSITION	1	Co Cmdr	-.1781	3.9672	8
POSITION	2	Plt Ldrs	-.4461	3.4158	37
POSITION	3	Other TCs	.1066	3.3782	31

Total Cases = 91
Missing Cases = 15 OR 16.5 PCT.

Frustration: Task 3 - Prepare/Send CONTACT Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	1923.43	67	28.71		
CONSTANT	39.84	1	39.84	1.39	.243
GRP(1)	162.16	1	162.16	5.65	.020
GRP(2)	134.50	1	134.50	4.69	.034
POSITION	6.15	2	3.07	.11	.899
GRP(1) BY POSITION	37.22	2	18.61	.65	.526
GRP(2) BY POSITION	13.61	2	6.81	.24	.790

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	850.40	67	12.69		
SCENARIO	8.86	1	8.86	.70	.406
GRP(1) BY SCENARIO	19.80	1	19.80	1.56	.216
GRP(2) BY SCENARIO	11.00	1	11.00	.87	.355
POSITION BY SCENARIO	44.25	2	22.12	1.74	.183
GRP(1) BY POSITION B Y SCENARIO	17.18	2	8.59	.68	.512
GRP(2) BY POSITION B Y SCENARIO	12.95	2	6.47	.51	.603

"Frustration: Task 3 - Prepare/Send CONTACT Report".

Cell Means and Standard Deviations
Variable .. T3DFFR

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-1.885	3.514	4	-7.476	3.706
POSITION	Plt Ldrs	-.642	3.745	13	-2.904	1.621
POSITION	Other TC	.114	3.049	13	-1.729	1.957
GRP	CVC2					
POSITION	Co Cmdr	7.730	.000	1		
POSITION	Plt Ldrs	3.295	4.834	13	.373	6.216
POSITION	Other TC	1.893	5.200	9	-2.104	5.891
GRP	M1 Base					
POSITION	Co Cmdr	1.333	7.529	3	-17.370	20.037
POSITION	Plt Ldrs	-.487	4.630	11	-3.598	2.623
POSITION	Other TC	-1.772	4.544	9	-5.265	1.721
For entire sample		.472	4.588	76	-.576	1.521

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Variable .. T3OFFR

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-1.822	2.145	4	-5.236	1.591
POSITION	Plt Ldrs	.353	2.778	13	-1.326	2.032
POSITION	Other TC	.251	5.566	13	-3.113	3.614
GRP	CVC2					
POSITION	Co Cmdr	.670	.000	1		
POSITION	Plt Ldrs	3.612	5.653	13	.196	7.027
POSITION	Other TC	1.891	5.497	9	-2.334	6.117
GRP	M1 Base					
POSITION	Co Cmdr	-1.837	7.089	3	-19.446	15.773
POSITION	Plt Ldrs	-.426	3.799	11	-2.978	2.126
POSITION	Other TC	.749	3.858	9	-2.217	3.714
For entire sample		.812	4.693	76	-.260	1.885

Frustration: Task 3 - Prepare/Send CONTACT Report

Summaries of T3AVFR
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6423	3.9235	76
GRP	1	IVC2	-.2307	3.2543	30
GRP	2	CVC2	2.8748	4.4389	23
GRP	3	M1 Base	-.4515	3.3635	23

Total Cases = 91
Missing Cases = 15 OR 16.5 PCT.

Summaries of T3AVFR
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6423	3.9235	76
POSITION	1	Co Cmdr	-.4963	4.6817	8
POSITION	2	Plt Ldrs	1.0268	4.0252	37
POSITION	3	Other TCs	.4773	3.6566	31

Total Cases = 91
Missing Cases = 15 OR 16.5 PCT.

Appendix F3
Prepare/Send CFF Report

Variable or term	Description
GRP(1)	ANOVA factor comparing CVCC with M1 Baseline
GRP(2)	ANOVA factor comparing CVCC with IVCC
TSK4DVN	Total workload deviation score--mean across scenarios
T4OFDVN and T4DFDVN	Not tested separately because of low n
T4DFMD	Mental Demand subscale deviation score for defensive scenario
T4OFMD	Mental Demand subscale deviation score for offensive scenario
T4AVMD	Mental Demand subscale deviation score--mean across scenarios
T4DFPD	Physical Demand subscale deviation score for defensive scenario
T4OFPD	Physical Demand subscale deviation score for offensive scenario
T4AVPD	Physical Demand subscale deviation score--mean across scenarios
T4DFTD	Time Demand subscale deviation score for defensive scenario
T4OFTD	Time Demand subscale deviation score for offensive scenario
T4AVTD	Time Demand subscale deviation score--mean across scenarios
T4DFEF	Effort subscale deviation score for defensive scenario
T4OFEF	Effort subscale deviation score for offensive scenario
T4AVEF	Effort subscale deviation score--mean across scenarios
T4DFFR	Frustration subscale deviation score for defensive scenario
T4OFFR	Frustration subscale deviation score for offensive scenario
T4AVFR	Frustration subscale deviation score--mean across scenarios

Multiple Regression variable	Description
T4WL	Total workload rating for task
CMT4WL1	Mental Demand subscale score for task
CMT4WL2	Physical Demand subscale score for task
CMT4WL3	Time Demand subscale score for task
CMT4WL5	Effort subscale score for task
CMT4WL6	Frustration subscale score for task

Deviation Scores: Task 4 - Prepare/Send CFF Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T4DVN using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	5096.04	47	108.43		
CONSTANT	97.39	1	97.39	.90	.348
GRP(1)	399.35	1	399.35	3.68	.061
GRP(2)	649.95	1	649.95	5.99	.018
POSITION	144.38	2	72.19	.67	.519
GRP(1) BY POSITION	575.69	2	287.84	2.65	.081
GRP(2) BY POSITION	701.52	2	350.76	3.24	.048

Summaries of T4DVN
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			2.8638	11.8351	56
GRP	1	IVC2	1.4251	9.2026	15
GRP	2	CVC2	6.8006	13.7242	27
GRP	3	M1 Base	-3.1870	7.1195	14

Total Cases = 56

Summaries of T4DVN
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			2.8638	11.8351	56
POSITION	1	Co Cmdr	2.2664	13.4630	11
POSITION	2	Plt Ldrs	5.4005	13.6666	27
POSITION	3	Other TCs	-.5760	6.1571	18

Total Cases = 56

Deviation Scores:

Cell Means and Standard Deviations
Variable .. T4DVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-7.406	7.511	3	-26.064	11.252
POSITION	Plt Ldrs	4.026	10.300	8	-4.585	12.636
POSITION	Other TC	2.847	3.370	4	-2.515	8.209
GRP	CVC2					
POSITION	Co Cadr	9.168	17.058	5	-12.011	30.348
POSITION	Plt Ldrs	12.997	13.644	12	4.328	21.666
POSITION	Other TC	-1.819	7.103	10	-6.900	3.262
GRP	M1 Base					
POSITION	Co Cadr	.436	1.867	3	-4.203	5.075
POSITION	Plt Ldrs	-6.051	8.568	7	-13.975	1.873
POSITION	Other TC	-.893	5.587	4	-9.782	7.997
For entire sample		2.864	11.835	56	-.306	6.033

. Prepare/Send CFF Report

**** MULTIPLE REGRESSION ****

Equation Number 1 Dependent Variable.. T4WL

Beginning Block Number 1. Method: Stepwise

Step	MultR	Rsq	AdjRsq	F(Eqn)	SigF	RsqCh	FCh	SigCh		Variable	BetaIn	Correl
1	.9423	.8880	.8856	364.703	.000	.8880	364.703	.000	In:	CMT4WL3	.9423	.9423
2	.9706	.9421	.9395	366.077	.000	.0541	42.044	.000	In:	CMT4WL5	.4087	.9072
3	.9840	.9682	.9661	446.845	.000	.0261	36.169	.000	In:	CMT4WL6	.2696	.8737

Variable(s) Entered on Step Number 3.. CMT4WL6

Multiple R	.98398
R Square	.96822
Adjusted R Square	.96605
Standard Error	4.21492

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	3	23815.29586	7938.43195
Residual	44	781.68331	17.76553

F = 446.84465 Signif F = .0000

Listwise Deletion of Missing Data

N of Cases = 48

Correlation:

	T4WL	CMT4WL1	CMT4WL2	CMT4WL3	CMT4WL5	CMT4WL6
T4WL	1.000	.900	.670	.942	.907	.874
CMT4WL1	.900	1.000	.503	.857	.773	.703
CMT4WL2	.670	.503	1.000	.577	.542	.450
CMT4WL3	.942	.857	.577	1.000	.822	.775
CMT4WL5	.907	.773	.542	.822	1.000	.751
CMT4WL6	.874	.703	.450	.775	.751	1.000

Mental Demand: Task 4 - Prepare/Send CFF Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T4AVMD using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	334.16	48	6.96		
CONSTANT	3.35	1	3.35	.48	.491
GRP(1)	42.19	1	42.19	6.06	.017
GRP(2)	40.33	1	40.33	5.79	.020
POSITION	10.95	2	5.48	.79	.461
GRP(1) BY POSITION	49.17	2	24.59	3.53	.037
GRP(2) BY POSITION	22.43	2	11.22	1.61	.210

"Mental Demand: Task 4 - Prepare/Send CFF Report".

Cell Means and Standard Deviations

Variable .. T4AVMD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-2.746	3.218	5	-6.741	1.249
POSITION	Plt Ldrs	.932	2.713	8	-1.337	3.200
POSITION	Other TC	.549	.772	4	-.680	1.777
GRP	CVC2					
POSITION	Co Cmdr	2.696	4.583	4	-4.597	9.989
POSITION	Plt Ldrs	2.842	3.122	12	.859	4.826
POSITION	Other TC	-.281	1.985	10	-1.701	1.139
GRP	M1 Base					
POSITION	Co Cmdr	.390	.744	3	-1.458	2.238
POSITION	Plt Ldrs	-1.215	1.879	7	-2.953	.523
POSITION	Other TC	-.756	1.954	4	-3.866	2.353
For entire sample		.485	3.007	57	-.313	1.283

Mental Demand: Task 4 - Prepare/Send CFF Report

Summaries of T4AVMD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4849	3.0074	57
GRP	1	IVC2	-.2400	2.9540	17
GRP	2	CVC2	1.6185	3.2518	26
GRP	3	M1 Base	-.7400	1.7357	14

Total Cases = 57

Summaries of T4AVMD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4849	3.0074	57
POSITION	1	Co Cadr	-.1479	3.9602	12
POSITION	2	Plt Ldrs	1.2243	3.1235	27
POSITION	3	Other TCs	-.2022	1.7530	18

Total Cases = 57

Task 4 - Prepare/Send CFF Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T4AVPD using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	135.48	48	2.82		
CONSTANT	.39	1	.39	.14	.710
GRP(1)	10.11	1	10.11	3.58	.064
GRP(2)	19.80	1	19.80	7.02	.011
POSITION	.17	2	.09	.03	.970
GRP(1) BY POSITION	14.27	2	7.13	2.53	.090
GRP(2) BY POSITION	13.56	2	6.78	2.40	.101

Task 4 - Prepare/Send CFF Report

Cell Means and Standard Deviations

Variable .. T4AVPD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-1.171	1.032	5	-2.453	.111
POSITION	Plt Ldrs	-.110	1.116	8	-1.043	.823
POSITION	Other TC	.474	1.100	4	-1.277	2.224
GRP	CVC2					
POSITION	Co Cmdr	1.244	1.609	4	-1.316	3.804
POSITION	Plt Ldrs	1.403	2.313	12	-.066	2.873
POSITION	Other TC	-.261	.370	10	-.526	.004
GRP	M1 Base					
POSITION	Co Cmdr	-.627	3.679	3	-9.766	8.513
POSITION	Plt Ldrs	-1.454	1.989	7	-3.294	.385
POSITION	Other TC	-.325	.260	4	-.738	.086
For entire sample		.018	1.843	57	-.471	.507

Task 4 - Prepare/Send CFF Report

Summaries of T4AVPD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.0176	1.8430	57
GRP	1	IVC2	-.2847	1.2011	17
GRP	2	CVC2	.7387	1.8349	26
GRP	3	M1 Base	-.9543	2.0506	14

Total Cases = 57

Summaries of T4AVPD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.0176	1.8430	57
POSITION	1	Co Cmdr	-.2300	2.1886	12
POSITION	2	Plt Ldrs	.2141	2.2240	27
POSITION	3	Other TCs	-.1119	.6343	18

Total Cases = 57

Task 4 - Prepare/Send CFF Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T4AVTD using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	436.85	49	8.92		
CONSTANT	10.75	1	10.75	1.21	.278
GRP(1)	23.88	1	23.88	2.68	.108
GRP(2)	42.33	1	42.33	4.75	.034
POSITION	23.49	2	11.75	1.32	.277
GRP(1) BY POSITION	79.51	2	39.76	4.46	.017
GRP(2) BY POSITION	86.72	2	43.36	4.86	.012

Task 4 - Prepare/Send CFF Report

Cell Means and Standard Deviations

Variable .. T4AVTD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-2.162	2.538	5	-5.314	.990
POSITION	Plt Ldrs	2.013	2.860	9	-.185	4.212
POSITION	Other TC	.669	.877	4	-.726	2.064
GRP	CVC2					
POSITION	Co Cmdr	3.635	4.458	4	-3.458	10.728
POSITION	Plt Ldrs	3.268	4.101	12	.662	5.873
POSITION	Other TC	-1.509	2.410	10	-3.233	.214
GRP	M1 Base					
POSITION	Co Cmdr	-.992	2.157	3	-6.351	4.367
POSITION	Plt Ldrs	-1.240	2.190	7	-3.266	.786
POSITION	Other TC	.619	1.667	4	-2.033	3.271
For entire sample		.680	3.481	58	-.235	1.596

Time Demand: Task 4 - Prepare/Send CFF Report

Summaries of T4AVTD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6803	3.4809	58
GRP	1	IVC2	.5547	2.9666	18
GRP	2	CVC2	1.4867	4.2105	26
GRP	3	M1 Base	-.6557	2.0690	14

Total Cases = 58

Summaries of T4AVTD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6803	3.4809	58
POSITION	1	Co Cmdr	.0629	3.9752	12
POSITION	2	Plt Ldrs	1.7375	3.7023	28
POSITION	3	Other TCs	-.5525	2.2164	18

Total Cases = 58

Task 4 - Prepare/Send CFF Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T4AVEF using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	310.86	48	6.48		
CONSTANT	9.29	1	9.29	1.43	.237
GRP(1)	24.66	1	24.66	3.81	.057
GRP(2)	35.88	1	35.88	5.54	.023
POSITION	4.79	2	2.40	.37	.693
GRP(1) BY POSITION	21.54	2	10.77	1.66	.200
GRP(2) BY POSITION	13.42	2	6.71	1.04	.363

Time Demand: Task 4 - Prepare/Send CFF Report

Cell Means and Standard Deviations

Variable .. T4AVEF

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-.901	.997	5	-2.139	.337
POSITION	Plt Ldrs	.521	2.473	8	-1.547	2.586
POSITION	Other TC	.544	1.386	4	-1.662	2.750
GRP	CVC2					
POSITION	Co Cadr	2.690	4.727	4	-4.832	10.212
POSITION	Plt Ldrs	2.397	2.889	12	.562	4.232
POSITION	Other TC	.063	1.537	10	-1.037	1.163
GRP	MI Base					
POSITION	Co Cadr	-.493	3.147	3	-8.310	7.323
POSITION	Plt Ldrs	-.504	3.070	7	-3.343	2.335
POSITION	Other TC	-.302	.792	4	-1.562	.957
For entire sample		.628	2.661	57	-.079	1.334

Task 4 - Prepare/Send CFF Report

Summaries of T4AVEF
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6275	2.6614	57
GRP	1	IVC2	.1079	1.9326	17
GRP	2	CVC2	1.5444	2.9395	26
GRP	3	M1 Base	-.4443	2.4547	14

Total Cases = 57

Summaries of T4AVEF
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6275	2.6614	57
POSITION	1	Co Cmdr	.3979	3.3391	12
POSITION	2	Plt Ldrs	1.0889	2.9873	27
POSITION	3	Other TCs	.0886	1.3365	18

Total Cases = 57

Task 4 - Prepare/Send CFF Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T4AVFR using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	277.70	48	5.79		
CONSTANT	1.56	1	1.56	.27	.606
GRP(1)	30.22	1	30.22	5.22	.027
GRP(2)	54.35	1	54.35	9.39	.004
POSITION	12.71	2	6.36	1.10	.342
GRP(1) BY POSITION	29.72	2	14.86	2.57	.087
GRP(2) BY POSITION	39.74	2	19.87	3.43	.040

Time Demand: Task 4 - Prepare/Send CFF Report

Cell Means and Standard Deviations

Variable .. T4AVFR

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-2.017	1.834	5	-4.294	.260
POSITION	Plt Ldrs	1.036	2.499	8	-1.054	3.125
POSITION	Other TC	.495	.945	4	-1.009	1.999
GRP	CVC2					
POSITION	Co Cmdr	2.114	3.192	4	-2.966	7.193
POSITION	Plt Ldrs	3.091	3.283	12	1.005	5.177
POSITION	Other TC	-.171	1.870	10	-1.509	1.167
GRP	M1 Base					
POSITION	Co Cmdr	-1.140	.756	3	-3.018	.738
POSITION	Plt Ldrs	-1.637	2.291	7	-3.756	.482
POSITION	Other TC	-.127	1.241	4	-2.103	1.848
For entire sample		.502	2.831	57	-.249	1.253

Task 4 - Prepare/Send CFF Report

Summaries of T4AVFR
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5023	2.8309	57
GRP	1	IVC2	.0106	2.3684	17
GRP	2	CVC2	1.6862	3.0951	26
GRP	3	M1 Base	-1.0993	1.8202	14

Total Cases = 57

Summaries of T4AVFR
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5023	2.8309	57
POSITION	1	Co Cmdr	-.4208	2.7822	12
POSITION	2	Plt Ldrs	1.2563	3.3579	27
POSITION	3	Other TCs	-.0133	1.5359	18

Total Cases = 57

Appendix F4
Prepare/Send Shell Report

Variable or term	Description
GRP(1)	ANOVA factor comparing CVCC with M1 Baseline
GRP(2)	ANOVA factor comparing CVCC with IVCC
T2DFDVN	Total workload deviation score for defensive scenario
T2OFDVN	Total workload deviation score for offensive scenario
TSK2DVN	Total workload deviation score--mean across scenarios

Deviation Scores: Task 2 - Prepare/Send SHELL Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	10116.59	44	229.92		
CONSTANT	425.71	1	425.71	1.85	.181
GRP(1)	336.92	1	336.92	1.47	.233
GRP(2)	55.49	1	55.49	.24	.626
POSITION	1219.26	2	609.63	2.65	.082
GRP(1) BY POSITION	270.38	2	135.19	.59	.560
GRP(2) BY POSITION	987.94	2	493.97	2.15	.129

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	4245.24	44	96.48		
SCENARIO	186.46	1	186.46	1.93	.171
GRP(1) BY SCENARIO	256.83	1	256.83	2.66	.110
GRP(2) BY SCENARIO	339.92	1	339.92	3.52	.067
POSITION BY SCENARIO	251.44	2	125.72	1.30	.282
GRP(1) BY POSITION BY SCENARIO	555.39	2	277.70	2.88	.067
GRP(2) BY POSITION BY SCENARIO	524.44	2	262.22	2.72	.077

Cell Means and Standard Deviations
Variable .. T2DFDVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-12.601	14.914	4	-36.332	11.129
POSITION	Plt Ldrs	-1.949	14.190	9	-12.856	8.959
POSITION	Other TC	-4.005	8.711	5	-14.821	6.810
GRP	CVC2					
POSITION	Co Cadr	-27.182	.000	1		
POSITION	Plt Ldrs	10.938	15.650	11	.424	21.451
POSITION	Other TC	-.131	7.125	10	-5.228	4.966
GRP	M1 Base					
POSITION	Co Cadr	-6.810	4.946	2	-51.251	37.631
POSITION	Plt Ldrs	-4.749	16.843	8	-18.830	9.332
POSITION	Other TC	6.574	4.639	3	-4.950	18.098
For entire sample		-.529	14.367	53	-4.489	3.431

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Variable .. T2OFDVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-13.861	14.978	4	-37.694	9.973
POSITION	Plt Ldrs	-1.127	13.049	9	-11.158	8.904
POSITION	Other TC	-.228	3.843	5	-4.999	4.543
GRP	CVC2					
POSITION	Co Cadr	7.273	.000	1		
POSITION	Plt Ldrs	7.679	16.197	11	-3.202	18.560
POSITION	Other TC	2.012	11.669	10	-6.335	10.360
GRP	M1 Base					
POSITION	Co Cadr	-8.869	2.926	2	-35.154	17.417
POSITION	Plt Ldrs	-3.277	11.024	8	-12.494	5.939
POSITION	Other TC	2.275	3.041	3	-5.279	9.829
For entire sample		.151	12.861	53	-3.394	3.696

Deviation Scores: Task 2 - Prepare/Send SHELL Report

Summaries of TSK2DVN
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.1890	11.7439	53
GRP	1	IVC2	-4.2971	11.3917	18
GRP	2	CVC2	4.6292	12.5404	22
GRP	3	M1 Base	-2.6545	8.0088	13

Total Cases = 91
Missing Cases = 38 OR 41.8 PCT.

Summaries of TSK2DVN
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.1890	11.7439	53
GRP	1	IVC2	-4.2971	11.3917	18
POSITION	1	Co Cmdr	-13.2310	13.6625	4
POSITION	2	Plt Ldrs	-1.5378	11.8783	9
POSITION	3	Other TCs	-2.1167	5.1432	5
GRP	2	CVC2	4.6292	12.5404	22
POSITION	1	Co Cmdr	-9.9546	.0000	1
POSITION	2	Plt Ldrs	9.3082	14.7032	11
POSITION	3	Other TCs	.9407	7.8251	10
GRP	3	M1 Base	-2.6545	8.0088	13
POSITION	1	Co Cmdr	-7.8395	1.0104	2
POSITION	2	Plt Ldrs	-4.0130	8.6529	8
POSITION	3	Other TCs	4.4247	3.5828	3

Total Cases = 91
Missing Cases = 38 OR 41.8 PCT.

Appendix F5
Prepare/Send Sitrep Report

Variable or term	Description
GRP(1)	ANOVA factor comparing CVCC with M1 Baseline
GRP(2)	ANOVA factor comparing CVCC with IVCC
T5DFDVN	Total workload deviation score for defensive scenario
T5OFDVN	Total workload deviation score for offensive scenario
TSK5DVN	Total workload deviation score-mean across scenarios
T5DFMD	Mental Demand subscale deviation score for defensive scenario
T5OFMD	Mental Demand subscale deviation score for offensive scenario
T5AVMD	Mental Demand subscale deviation score--mean across scenarios
T5DFPD	Physical Demand subscale deviation score for defensive scenario
T5OFPD	Physical Demand subscale deviation score for offensive scenario
T5AVPD	Physical Demand subscale deviation score--mean across scenarios
T5DFTD	Time Demand subscale deviation score for defensive scenario
T5OFTD	Time Demand subscale deviation score for offensive scenario
T5AVTD	Time Demand subscale deviation score--mean across scenarios
T5DFEF	Effort subscale deviation score for defensive scenario
T5OFEF	Effort subscale deviation score for offensive scenario
T5AVEF	Effort subscale deviation score--mean across scenarios
T5DFFR	Frustration subscale deviation score for defensive scenario
T5OFFR	Frustration subscale deviation score for offensive scenario
T5AVFR	Frustration subscale deviation score--mean across scenarios

Deviation Scores: Task 5 - Prepare/Send SITREP Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	19131.62	70	273.31		
CONSTANT	1930.54	1	1930.54	7.06	.010
GRP(1)	314.45	1	314.45	1.15	.287
GRP(2)	733.03	1	733.03	2.68	.106
POSITION	1567.40	2	783.70	2.87	.064
GRP(1) BY POSITION	89.41	2	44.70	.16	.849
GRP(2) BY POSITION	229.97	2	114.98	.42	.658

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	6924.26	70	98.92		
SCENARIO	166.61	1	166.61	1.68	.199
GRP(1) BY SCENARIO	24.64	1	24.64	.25	.619
GRP(2) BY SCENARIO	25.49	1	25.49	.26	.613
POSITION BY SCENARIO	199.85	2	99.92	1.01	.369
GRP(1) BY POSITION BY SCENARIO	616.71	2	308.36	3.12	.050
GRP(2) BY POSITION BY SCENARIO	300.26	2	150.13	1.52	.226

Deviation Scores:

Cell Means and Standard Deviations
Variable .. T5DFDVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	15.853	9.026	2	-65.243	96.948
POSITION	Plt Ldrs	6.656	17.753	14	-3.595	16.906
POSITION	Other TC	4.694	8.633	11	-1.106	10.493
GRP	CVC2					
POSITION	Co Cadr	3.079	26.947	5	-30.380	36.538
POSITION	Plt Ldrs	9.648	15.201	14	.871	18.425
POSITION	Other TC	-1.771	10.197	11	-8.621	5.080
GRP	M1 Base					
POSITION	Co Cadr	-3.651	5.513	3	-17.347	10.045
POSITION	Plt Ldrs	-4.266	10.585	10	-11.838	3.307
POSITION	Other TC	-2.757	10.776	9	-11.040	5.527
For entire sample		2.900	14.433	79	-.333	6.133

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Variable .. T5DFDVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	13.000	2.828	2	-12.412	38.412
POSITION	Plt Ldrs	14.197	11.838	14	7.362	21.032
POSITION	Other TC	.624	10.341	11	-6.324	7.571
GRP	CVC2					
POSITION	Co Cadr	9.458	29.139	5	-26.722	45.637
POSITION	Plt Ldrs	6.823	13.726	14	-1.103	14.748
POSITION	Other TC	2.401	12.257	11	-5.834	10.635
GRP	M1 Base					
POSITION	Co Cadr	9.118	15.094	3	-28.379	46.615
POSITION	Plt Ldrs	.282	9.800	10	-6.728	7.292
POSITION	Other TC	-5.550	8.788	9	-12.305	1.205
For entire sample		4.823	13.960	79	1.697	7.950

Deviation Scores: Task 5 - Prepare/Send SITREP Report

Summaries of TSK5DVN
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			3.8616	12.2830	79
GRP	1	IVC2	7.5580	10.5196	27
GRP	2	CVC2	5.0034	14.9439	30
GRP	3	M1 Base	-2.2317	7.5267	22

Total Cases = 91
Missing Cases = 12 OR 13.2 PCT.

Summaries of TSK5DVN
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			3.8616	12.2830	79
GRP	1	IVC2	7.5580	10.5196	27
POSITION	1	Co Cmdr	14.4265	3.0988	2
POSITION	2	Plt Ldrs	10.4261	11.2850	14
POSITION	3	Other TCs	2.6588	8.5937	11
GRP	2	CVC2	5.0034	14.9439	30
POSITION	1	Co Cmdr	6.2682	26.3777	5
POSITION	2	Plt Ldrs	8.2354	13.4032	14
POSITION	3	Other TCs	.3151	9.8066	11
GRP	3	M1 Base	-2.2317	7.5267	22
POSITION	1	Co Cmdr	2.7333	6.9885	3
POSITION	2	Plt Ldrs	-1.9918	8.3808	10
POSITION	3	Other TCs	-4.1534	6.6341	9

Total Cases = 91
Missing Cases = 12 OR 13.2 PCT.

Mental Demand: Task 5 - Prepare/Send SITREP Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	1049.99	73	14.38		
CONSTANT	67.55	1	67.55	4.70	.033
GRP(1)	5.72	1	5.72	.40	.530
GRP(2)	30.59	1	30.59	2.13	.149
POSITION	106.51	2	53.26	3.70	.029
GRP(1) BY POSITION	72.63	2	36.32	2.52	.087
GRP(2) BY POSITION	2.88	2	1.44	.10	.905

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	352.85	73	4.83		
SCENARIO	17.61	1	17.61	3.64	.060
GRP(1) BY SCENARIO	15.97	1	15.97	3.30	.073
GRP(2) BY SCENARIO	.73	1	.73	.15	.698
POSITION BY SCENARIO	18.42	2	9.21	1.91	.156
GRP(1) BY POSITION BY SCENARIO	63.15	2	31.58	6.53	.002
GRP(2) BY POSITION BY SCENARIO	3.99	2	1.99	.41	.664

Mental Demand: Task 5 - Prepare/Send SITREP Report

Cell Means and Standard Deviations
Variable .. T5DFMD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	.906	6.438	5	-7.088	8.900
POSITION	Plt Ldrs	1.396	2.497	14	-.046	2.838
POSITION	Other TC	.913	1.821	11	-.310	2.136
GRP	CVC2					
POSITION	Co Cadr	1.577	6.248	4	-8.365	11.520
POSITION	Plt Ldrs	1.223	3.624	14	-.870	3.316
POSITION	Other TC	-.579	3.556	12	-2.839	1.680
GRP	MI Base					
POSITION	Co Cadr	-.227	.616	3	-1.756	1.303
POSITION	Plt Ldrs	-.688	2.786	10	-2.681	1.305
POSITION	Other TC	-1.263	3.384	9	-3.864	1.338
For entire sample		.386	3.428	82	-.367	1.139

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Variable .. T5OFMD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-.998	5.026	5	-7.238	5.242
POSITION	Plt Ldrs	3.537	3.235	14	1.669	5.405
POSITION	Other TC	-.752	2.084	11	-2.152	.648
GRP	CVC2					
POSITION	Co Cadr	4.815	3.967	4	-1.497	11.127
POSITION	Plt Ldrs	.918	2.415	14	-.476	2.312
POSITION	Other TC	.011	2.443	12	-1.541	1.563
GRP	MI Base					
POSITION	Co Cadr	2.980	3.466	3	-5.631	11.591
POSITION	Plt Ldrs	.427	1.655	10	-.757	1.611
POSITION	Other TC	-.884	1.404	9	-1.964	.195
For entire sample		.899	3.130	82	.212	1.587

Mental Demand: Task 5 - Prepare/Send SITREP Report

Summaries of TSAVMD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6427	2.8338	82
GRP	1	IVC2	1.1728	2.9481	30
GRP	2	CVC2	.8120	3.1637	30
GRP	3	M1 Base	-.3109	1.9379	22

Total Cases = 91
Missing Cases = 9 OR 9.9 PCT.

Summaries of TSAVMD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6427	2.8338	82
POSITION	1	Co Cmdr	1.3904	4.4360	12
POSITION	2	Plt Ldrs	1.2687	2.4885	38
POSITION	3	Other TCs	-.3809	2.1980	32

Total Cases = 91
Missing Cases = 9 OR 9.9 PCT.

Summaries of TSAVMD
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6427	2.8338	82
GRP	1	IVC2	1.1728	2.9481	30
POSITION	1	Co Cmdr	-.0460	5.5744	5
POSITION	2	Plt Ldrs	2.4664	2.1220	14
POSITION	3	Other TCs	.0805	1.5886	11
GRP	2	CVC2	.8120	3.1637	30
POSITION	1	Co Cmdr	3.1963	4.4957	4
POSITION	2	Plt Ldrs	1.0704	2.7546	14
POSITION	3	Other TCs	-.2842	2.9060	12
GRP	3	M1 Base	-.3109	1.9379	22
POSITION	1	Co Cmdr	1.3767	2.0205	3
POSITION	2	Plt Ldrs	-.1305	1.8777	10
POSITION	3	Other TCs	-1.0739	1.7628	9

Total Cases = 91
Missing Cases = 9 OR 9.9 PCT.

Physical Demand: Task 5 - Prepare/Send SITREP Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	489.15	73	6.70		
CONSTANT	2.87	1	2.87	.43	.515
GRP(1)	5.77	1	5.77	.86	.357
GRP(2)	39.27	1	39.27	5.86	.018
POSITION	36.87	2	18.43	2.75	.070
GRP(1) BY POSITION	12.47	2	6.23	.93	.399
GRP(2) BY POSITION	4.76	2	2.38	.36	.702

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	390.17	73	5.34		
SCENARIO	14.17	1	14.17	2.65	.108
GRP(1) BY SCENARIO	8.44	1	8.44	1.58	.213
GRP(2) BY SCENARIO	12.71	1	12.71	2.38	.127
POSITION BY SCENARIO	42.78	2	21.39	4.00	.022
GRP(1) BY POSITION BY SCENARIO	11.77	2	5.89	1.10	.338
GRP(2) BY POSITION BY SCENARIO	2.99	2	1.49	.28	.757

"Physical Demand: Task 5 - Prepare/Send SITREP Report".

Cell Means and Standard Deviations
Variable .. T5DFPD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-.182	1.741	5	-2.344	1.980
POSITION	Plt Ldrs	1.323	3.409	14	-.645	3.291
POSITION	Other TC	.766	1.806	11	-.447	1.980
GRP	CVC2					
POSITION	Co Cadr	-.193	.880	4	-1.593	1.208
POSITION	Plt Ldrs	1.299	2.446	14	-.114	2.711
POSITION	Other TC	.485	1.087	12	-.201	1.180
GRP	M1 Base					
POSITION	Co Cadr	-3.077	.901	3	-5.315	-.838
POSITION	Plt Ldrs	-.971	2.014	10	-2.412	.470
POSITION	Other TC	-1.130	2.901	9	-3.360	1.100
For entire sample		.246	2.476	82	-.297	.790

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Variable .. T5OFPD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-.960	1.404	5	-2.703	.783
POSITION	Plt Ldrs	1.618	3.507	14	-.407	3.643
POSITION	Other TC	-.755	1.761	11	-1.938	.429
GRP	CVC2					
POSITION	Co Cadr	2.430	3.516	4	-3.165	8.025
POSITION	Plt Ldrs	1.259	2.871	14	-.399	2.916
POSITION	Other TC	-.499	1.337	12	-1.348	.350
GRP	M1 Base					
POSITION	Co Cadr	2.407	6.460	3	-13.641	18.454
POSITION	Plt Ldrs	-.269	1.911	10	-1.636	1.098
POSITION	Other TC	-.810	.862	9	-1.473	-.147
For entire sample		.343	2.712	82	-.253	.939

Physical Demand: Task 5 - Prepare/Send SITREP Report

Summaries of T5AVPD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.2948	1.9560	82
GRP	1	IVC2	.5932	2.2051	30
GRP	2	CVC2	.7438	1.7868	30
GRP	3	M1 Base	-.7243	1.4592	22

Total Cases = 91
Missing Cases = 9 OR 9.9 PCT.

Summaries of T5AVPD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.2948	1.9560	82
POSITION	1	Co Cadr	.0513	2.0822	12
POSITION	2	Plt Ldrs	.8496	2.2706	38
POSITION	3	Other TCs	-.2727	1.2536	32

Total Cases = 91
Missing Cases = 9 OR 9.9 PCT.

Summaries of T5AVPD
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.2948	1.9560	82
GRP	1	IVC2	.5932	2.2051	30
POSITION	1	Co Cadr	-.5710	1.5251	5
POSITION	2	Plt Ldrs	1.4704	2.6431	14
POSITION	3	Other TCs	.0059	1.3984	11
GRP	2	CVC2	.7438	1.7868	30
POSITION	1	Co Cadr	1.1188	1.8346	4
POSITION	2	Plt Ldrs	1.2786	2.1876	14
POSITION	3	Other TCs	-.0050	.9035	12
GRP	3	M1 Base	-.7243	1.4592	22
POSITION	1	Co Cadr	-.3350	3.2673	3
POSITION	2	Plt Ldrs	-.6200	.9525	10
POSITION	3	Other TCs	-.9700	1.3272	9

Total Cases = 91
Missing Cases = 9 OR 9.9 PCT.

Time Demand: Task 5 - Prepare/Send SITREP Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	2129.73	73	29.17		
CONSTANT	515.13	1	515.13	17.66	.000
GRP(1)	23.49	1	23.49	.81	.372
GRP(2)	84.99	1	84.99	2.91	.092
POSITION	220.45	2	110.23	3.78	.027
GRP(1) BY POSITION	2.31	2	1.16	.04	.961
GRP(2) BY POSITION	21.31	2	10.65	.37	.695

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	563.26	73	7.72		
SCENARIO	.87	1	.87	.11	.738
GRP(1) BY SCENARIO	4.03	1	4.03	.52	.472
GRP(2) BY SCENARIO	11.95	1	11.95	1.55	.217
POSITION BY SCENARIO	18.94	2	9.47	1.23	.299
GRP(1) BY POSITION BY SCENARIO	21.32	2	10.66	1.38	.258
GRP(2) BY POSITION BY SCENARIO	33.63	2	16.92	2.19	.119

"Time Demand: Task 5 - Prepare/Send SITREP Report".

Cell Means and Standard Deviations
Variable .. T5DFTD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	3.674	6.590	5	-4.509	11.857
POSITION	Plt Ldrs	1.713	6.320	14	-1.936	5.362
POSITION	Other TC	.639	2.118	11	-.784	2.062
GRP	CVC2					
POSITION	Co Cadr	4.148	6.264	4	-5.819	14.114
POSITION	Plt Ldrs	3.187	4.510	14	.583	5.791
POSITION	Other TC	.449	5.083	12	-2.781	3.679
GRP	M1 Base					
POSITION	Co Cadr	4.077	4.648	3	-7.469	15.622
POSITION	Plt Ldrs	-.811	2.667	10	-2.719	1.097
POSITION	Other TC	.549	2.974	9	-1.737	2.835
For entire sample		1.525	4.684	82	.496	2.554

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Variable .. T5OFTD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	2.802	5.891	5	-4.513	10.117
POSITION	Plt Ldrs	3.359	3.585	14	1.289	5.428
POSITION	Other TC	.298	3.469	11	-2.032	2.629
GRP	CVC2					
POSITION	Co Cadr	5.372	5.407	4	-3.232	13.977
POSITION	Plt Ldrs	3.373	4.016	14	1.054	5.692
POSITION	Other TC	1.959	5.116	12	-1.291	5.209
GRP	M1 Base					
POSITION	Co Cadr	3.133	2.992	3	-4.300	10.567
POSITION	Plt Ldrs	.536	2.755	10	-1.435	2.507
POSITION	Other TC	-1.698	1.278	9	-2.680	-.715
For entire sample		1.903	4.144	82	.992	2.813

Time Demand: Task 5 - Prepare/Send SITREP Report

Summaries of T5AVTD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			1.7137	3.9592	82
GRP	1	IVC2	1.8948	4.1241	30
GRP	2	CVC2	2.6470	4.3632	30
GRP	3	M1 Base	.1941	2.6409	22

Total Cases = 91
Missing Cases = 9 OR 9.9 PCT.

Summaries of T5AVTD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			1.7137	3.9592	82
POSITION	1	Co Cadr	3.8371	4.9175	12
POSITION	2	Plt Ldrs	2.1064	3.9399	38
POSITION	3	Other TCs	.4511	3.2047	32

Total Cases = 91
Missing Cases = 9 OR 9.9 PCT.

Summaries of T5AVTD
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			1.7137	3.9592	82
GRP	1	IVC2	1.8948	4.1241	30
POSITION	1	Co Cadr	3.2380	6.1828	5
POSITION	2	Plt Ldrs	2.5357	4.3157	14
POSITION	3	Other TCs	.4686	2.4706	11
GRP	2	CVC2	2.6470	4.3632	30
POSITION	1	Co Cadr	4.7600	5.1384	4
POSITION	2	Plt Ldrs	3.2800	3.9959	14
POSITION	3	Other TCs	1.2042	4.4400	12
GRP	3	M1 Base	.1941	2.6409	22
POSITION	1	Co Cadr	3.6050	3.7763	3
POSITION	2	Plt Ldrs	-.1375	2.4135	10
POSITION	3	Other TCs	-.5744	1.7392	9

Total Cases = 91
Missing Cases = 9 OR 9.9 PCT.

Effort: Task 5 - Prepare/Send SITREP Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	1123.23	73	15.39		
CONSTANT	53.89	1	53.89	3.50	.065
GRP(1)	.93	1	.93	.06	.806
GRP(2)	52.88	1	52.88	3.44	.068
POSITION	54.37	2	27.19	1.77	.178
GRP(1) BY POSITION	44.64	2	22.32	1.45	.241
GRP(2) BY POSITION	50.67	2	25.34	1.65	.200

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	464.85	73	6.37		
SCENARIO	2.36	1	2.36	.37	.545
GRP(1) BY SCENARIO	7.09	1	7.09	1.11	.295
GRP(2) BY SCENARIO	.14	1	.14	.02	.881
POSITION BY SCENARIO	9.76	2	4.88	.77	.468
GRP(1) BY POSITION B Y SCENARIO	20.54	2	10.27	1.61	.206
GRP(2) BY POSITION B Y SCENARIO	22.79	2	11.40	1.79	.174

"Effort: Task 5 - Prepare/Send SITREP Report".

Cell Means and Standard Deviations
Variable .. T5DFEF

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-.374	3.196	5	-4.342	3.594
POSITION	Plt Ldrs	1.329	3.125	14	-.475	3.134
POSITION	Other TC	.697	2.067	11	-.691	2.086
GRP	CVC2					
POSITION	Co Cadr	3.110	5.269	4	-5.273	11.493
POSITION	Plt Ldrs	1.824	4.069	14	-.525	4.174
POSITION	Other TC	-1.036	2.794	12	-2.811	.739
GRP	M1 Base					
POSITION	Co Cadr	-.243	3.280	3	-8.392	7.905
POSITION	Plt Ldrs	-1.060	2.606	10	-2.924	.804
POSITION	Other TC	.453	2.408	9	-1.398	2.304
For entire sample		.521	3.228	82	-.188	1.230

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Variable .. T5OFEF

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	1.572	5.402	5	-5.135	8.279
POSITION	Plt Ldrs	2.961	2.669	14	1.420	4.502
POSITION	Other TC	.321	2.972	11	-1.675	2.317
GRP	CVC2					
POSITION	Co Cadr	3.020	4.820	4	-4.649	10.689
POSITION	Plt Ldrs	1.085	3.456	14	-.910	3.080
POSITION	Other TC	-.303	2.857	12	-2.118	1.513
GRP	M1 Base					
POSITION	Co Cadr	-.603	1.709	3	-4.849	3.642
POSITION	Plt Ldrs	.114	3.606	10	-2.466	2.694
POSITION	Other TC	-.979	4.013	9	-4.064	2.106
For entire sample		.817	3.530	82	.041	1.593

Effort: Task 5 - Prepare/Send SITREP Report

Summaries of T5AVEF
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6690	2.8759	82
GRP	1	IVC2	1.2875	2.6591	30
GRP	2	CVC2	.8198	3.3381	30
GRP	3	M1 Base	-.3802	2.2400	22

Total Cases = 91
Missing Cases = 9 OR 9.9 PCT.

Summaries of T5AVEF
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6690	2.8759	82
POSITION	1	Co Cadr	1.1654	3.7954	12
POSITION	2	Plt Ldrs	1.2017	2.9857	38
POSITION	3	Other TCs	-.1498	2.1737	32

Total Cases = 91
Missing Cases = 9 OR 9.9 PCT.

Frustration: Task 5 - Prepare/Send SITREP Report

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	1222.13	73	16.74		
CONSTANT	55.18	1	55.18	3.30	.074
GRP(1)	6.71	1	6.71	.40	.529
GRP(2)	136.38	1	136.38	8.15	.006
POSITION	17.79	2	8.89	.53	.590
GRP(1) BY POSITION	74.66	2	37.33	2.23	.115
GRP(2) BY POSITION	26.35	2	13.18	.79	.459

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	935.11	73	12.81		
SCENARIO	12.61	1	12.61	.98	.324
GRP(1) BY SCENARIO	4.05	1	4.05	.32	.576
GRP(2) BY SCENARIO	9.31	1	9.31	.73	.397
POSITION BY SCENARIO	11.07	2	5.53	.43	.651
GRP(1) BY POSITION B Y SCENARIO	36.51	2	18.25	1.43	.247
GRP(2) BY POSITION B Y SCENARIO	10.78	2	5.39	.42	.658

"Frustration: Task 5 - Prepare/Send SITREP Report".

Cell Means and Standard Deviations
Variable .. T5DFFR

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	.004	5.486	5	-6.807	6.815
POSITION	Plt Ldrs	.845	4.951	14	-2.014	3.704
POSITION	Other TC	1.680	2.378	11	.083	3.277
GRP	CVC2					
POSITION	Co Cmdr	3.316	4.958	4	-4.572	11.207
POSITION	Plt Ldrs	2.113	4.114	14	-.262	4.488
POSITION	Other TC	-.052	2.692	12	-1.762	1.659
GRP	M1 Base					
POSITION	Co Cmdr	-2.667	4.309	3	-13.371	8.037
POSITION	Plt Ldrs	-.736	2.539	10	-2.552	1.080
POSITION	Other TC	-1.366	4.787	9	-5.045	2.314
For entire sample		.548	4.028	82	-.337	1.433

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Variable .. T5OFFR

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	.562	4.545	5	-5.061	6.205
POSITION	Plt Ldrs	2.719	3.668	14	.601	4.837
POSITION	Other TC	1.425	3.127	11	-.675	3.526
GRP	CVC2					
POSITION	Co Cmdr	4.160	4.328	4	-2.727	11.047
POSITION	Plt Ldrs	.308	3.792	14	-1.882	2.497
POSITION	Other TC	.597	3.891	12	-1.876	3.069
GRP	M1 Base					
POSITION	Co Cmdr	.830	2.165	3	-4.549	6.209
POSITION	Plt Ldrs	-.529	3.785	10	-3.237	2.179
POSITION	Other TC	-1.180	3.647	9	-3.983	1.623
For entire sample		.869	3.796	82	.035	1.703

Frustration: Task 5 - Prepare/Send SITREP Report

Summaries of T5AVFR
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7082	3.0220	82
GRP	1	IVC2	1.4480	3.2688	30
GRP	2	CVC2	1.1723	2.8261	30
GRP	3	M1 Base	-.9334	2.3123	22

Total Cases = 91
Missing Cases = 9 OR 9.9 PCT.

Summaries of T5AVFR
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7082	3.0220	82
POSITION	1	Co Cmdr	1.1346	3.9221	12
POSITION	2	Plt Ldrs	.9359	3.1233	38
POSITION	3	Other TCs	.2780	2.5368	32

Total Cases = 91
Missing Cases = 9 OR 9.9 PCT.

Appendix G

Command and Control Task Analysis of Variance Summaries, Descriptive Statistics, and Multiple Regressions

Appendix G1
Determine Location

Variable or term	Description
GRP(1)	ANOVA factor comparing CVCC with M1 Baseline
GRP(2)	ANOVA factor comparing CVCC with IVCC
T6DFDVN	Total workload deviation score for defensive scenario
T6OFDVN	Total workload deviation score for offensive scenario
TSK6DVN	Total workload deviation score-mean across scenarios
T6DFMD	Mental Demand subscale deviation score for defensive scenario
T6OFMD	Mental Demand subscale deviation score for offensive scenario
T6AVMD	Mental Demand subscale deviation score--mean across scenarios
T6DFPD	Physical Demand subscale deviation score for defensive scenario
T6OFPD	Physical Demand subscale deviation score for offensive scenario
T6AVPD	Physical Demand subscale deviation score--mean across scenarios
T6DFTD	Time Demand subscale deviation score for defensive scenario
T6OFTD	Time Demand subscale deviation score for offensive scenario
T6AVTD	Time Demand subscale deviation score--mean across scenarios
T6DFEF	Effort subscale deviation score for defensive scenario
T6OFEF	Effort subscale deviation score for offensive scenario
T6AVEF	Effort subscale deviation score--mean across scenarios
T6DFFR	Frustration subscale deviation score for defensive scenario
T6OFFR	Frustration subscale deviation score for offensive scenario
T6AVFR	Frustration subscale deviation score--mean across scenarios

Multiple Regression variable	Description
T6WL	Total workload rating for task
CMT6WL1	Mental Demand subscale score for task
CMT6WL2	Physical Demand subscale score for task
CMT6WL3	Time Demand subscale score for task
CMT6WL5	Effort subscale score for task
CMT6WL6	Frustration subscale score for task

Deviation Scores: Task 6 - Determine Location

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	9503.94	76	125.05		
SCENARIO	28.02	1	28.02	.22	.637
GRP(1) BY SCENARIO	153.12	1	153.12	1.22	.272
GRP(2) BY SCENARIO	.07	1	.07	.00	.982
POSITION BY SCENARIO	263.83	2	131.92	1.05	.353
GRP(1) BY POSITION BY SCENARIO	703.98	2	351.99	2.81	.066
GRP(2) BY POSITION BY SCENARIO	135.90	2	67.95	.54	.583

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	25295.15	76	332.83		
CONSTANT	3436.95	1	3436.95	10.33	.002
GRP(1)	619.87	1	619.87	1.86	.176
GRP(2)	15804.41	1	15804.41	47.48	.000
POSITION	4603.82	2	2301.91	6.92	.002
GRP(1) BY POSITION	136.72	2	68.36	.21	.815
GRP(2) BY POSITION	1310.45	2	655.23	1.97	.147

Deviation Scores

Cell Means and Standard Deviations
Variable .. T6DFDVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-16.601	13.051	4	-37.369	4.166
POSITION	Plt Ldrs	-14.773	14.427	14	-23.103	-6.443
POSITION	Other TC	-8.389	13.714	12	-17.102	.324
GRP	CVC2					
POSITION	Co Cmdr	-19.121	22.991	5	-47.668	9.425
POSITION	Plt Ldrs	-24.852	10.965	14	-31.183	-18.521
POSITION	Other TC	-3.508	16.327	12	-13.881	6.866
GRP	M1 Base					
POSITION	Co Cmdr	18.015	21.536	3	-35.483	71.514
POSITION	Plt Ldrs	2.099	18.851	11	-10.565	14.764
POSITION	Other TC	15.919	17.421	10	3.456	28.381
For entire sample		-7.332	20.036	85	-11.653	-3.010

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Variable .. T6DFDVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-12.111	17.560	4	-40.053	15.831
POSITION	Plt Ldrs	-16.375	12.393	14	-23.530	-9.219
POSITION	Other TC	1.831	6.113	12	-2.053	5.715
GRP	CVC2					
POSITION	Co Cmdr	-20.942	32.391	5	-61.161	19.276
POSITION	Plt Ldrs	-20.535	14.494	14	-28.903	-12.166
POSITION	Other TC	-8.146	13.824	12	-16.929	.637
GRP	M1 Base					
POSITION	Co Cmdr	13.784	11.997	3	-16.017	43.586
POSITION	Plt Ldrs	12.093	15.014	11	2.006	22.179
POSITION	Other TC	7.672	9.350	10	.983	14.360
For entire sample		-5.819	18.534	85	-9.816	-1.821

Deviation Scores: Task 6 - Determine Location

Summaries of TSK6DVN
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-6.5751	17.4742	85
GRP	1	IVC2	-10.4935	11.6896	30
GRP	2	CVC2	-15.7359	16.2128	31
GRP	3	M1 Base	10.1546	13.2236	24

Total Cases = 91
Missing Cases = 6 OR 6.6 PCT.

Summaries of TSK6DVN
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-6.5751	17.4742	85
POSITION	1	Co Cadr	-9.1570	24.1805	12
POSITION	2	Plt Ldrs	-11.7354	17.1991	39
POSITION	3	Other TCs	.2554	12.6393	34

Total Cases = 91
Missing Cases = 6 OR 6.6 PCT.

Summaries of TSK6DVN
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-6.5751	17.4742	85
GRP	1	IVC2	-10.4935	11.6896	30
POSITION	1	Co Cadr	-14.3500	11.2909	4
POSITION	2	Plt Ldrs	-15.5729	12.0558	14
POSITION	3	Other TCs	-3.2729	7.6589	12
GRP	2	CVC2	-15.7350	16.2128	31
POSITION	1	Co Cadr	-20.0318	26.9448	5
POSITION	2	Plt Ldrs	-22.6922	9.5150	14
POSITION	3	Other TCs	-5.8267	12.9907	12
GRP	3	M1 Base	10.1546	13.2236	24
POSITION	1	Co Cadr	15.9000	16.7651	3
POSITION	2	Plt Ldrs	7.0981	15.4472	11
POSITION	3	Other TCs	11.7953	9.6881	10

Total Cases = 91
Missing Cases = 6 OR 6.6 PCT.

Determine Location

**** MULTIPLE REGRESSION ****

Equation Number 1 Dependent Variable.. T6WL

Beginning Block Number 1. Method: Stepwise

Step	MultR	Rsq	AdjRsq	F(Eqn)	SigF	RsqCh	FCh	SigCh		Variable	Betain	Correl
1	.9235	.8528	.8504	353.531	.000	.8528	353.531	.000	In:	CMT6WL1	.9235	.9235
2	.9769	.9543	.9528	626.571	.000	.1015	133.234	.000	In:	CMT6WL6	.4428	.8706
3	.9907	.9816	.9806	1047.757	.000	.0273	87.318	.000	In:	CMT6WL5	.2489	.8370

Variable(s) Entered on Step Number 3.. CMT6WL5

Multiple R	.99074
R Square	.98158
Adjusted R Square	.98064
Standard Error	2.88003

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	3	26072.04962	8690.68321
Residual	59	489.37895	8.29456

F = 1047.75718 Signif F = .0000

Listwise Deletion of Missing Data

N of Cases = 63

Correlation:

	T6WL	CMT6WL1	CMT6WL2	CMT6WL3	CMT6WL5	CMT6WL6
T6WL	1.000	.923	.752	.897	.837	.871
CMT6WL1	.923	1.000	.707	.879	.681	.695
CMT6WL2	.752	.707	1.000	.566	.519	.648
CMT6WL3	.897	.879	.566	1.000	.638	.687
CMT6WL5	.837	.681	.519	.638	1.000	.696
CMT6WL6	.871	.695	.648	.687	.696	1.000

Mental Demand: Task 6 - Determine Location

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	1511.30	76	19.88		
CONSTANT	129.96	1	129.96	6.54	.013
GRP(1)	17.23	1	17.23	.87	.355
GRP(2)	715.44	1	715.44	35.98	.000
POSITION	443.14	2	221.57	11.14	.000
GRP(1) BY POSITION	7.94	2	3.97	.20	.820
GRP(2) BY POSITION	44.59	2	22.29	1.12	.331

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	657.69	76	8.65		
SCENARIO	.00	1	.00	.00	.990
GRP(1) BY SCENARIO	8.10	1	8.10	.94	.336
GRP(2) BY SCENARIO	.02	1	.02	.00	.960
POSITION BY SCENARIO	14.11	2	7.06	.82	.446
GRP(1) BY POSITION BY SCENARIO	32.17	2	16.09	1.86	.163
GRP(2) BY POSITION BY SCENARIO	4.36	2	2.18	.25	.778

Cell Means and Standard Deviations
Variable .. T6DFMD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-4.894	4.562	5	-10.558	.770
POSITION	Plt Ldrs	-3.104	3.663	14	-5.219	-.990
POSITION	Other TC	-.563	2.996	12	-2.467	1.340
GRP	CVC2					
POSITION	Co Cadr	-4.173	5.721	4	-13.275	4.930
POSITION	Plt Ldrs	-5.349	2.027	14	-6.519	-4.178
POSITION	Other TC	.156	4.546	12	-2.733	3.044
GRP	M1 Base					
POSITION	Co Cadr	4.107	5.726	3	-10.118	18.331
POSITION	Plt Ldrs	.295	3.253	11	-1.891	2.480
POSITION	Other TC	4.363	4.105	10	1.426	7.300
For entire sample		-1.238	4.755	85	-2.263	-.212

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Variable .. T6OFMD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-3.598	4.429	5	-9.097	1.901
POSITION	Plt Ldrs	-3.677	4.446	14	-6.244	-1.110
POSITION	Other TC	1.005	2.235	12	-.415	2.425
GRP	CVC2					
POSITION	Co Cadr	-4.685	8.258	4	-17.825	8.455
POSITION	Plt Ldrs	-4.582	4.047	14	-6.919	-2.245
POSITION	Other TC	-1.315	3.643	12	-3.630	1.000
GRP	M1 Base					
POSITION	Co Cadr	2.647	2.900	3	-4.557	9.850
POSITION	Plt Ldrs	2.297	2.630	11	.531	4.064
POSITION	Other TC	2.804	2.801	10	.801	4.807
For entire sample		-1.116	4.669	85	-2.123	-.109

Mental Demand: Task 6 - Determine Location

Summaries of T6AVMD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-1.1766	4.2234	85
GRP	1	IVC2	-2.1306	3.3471	31
GRP	2	CVC2	-3.1395	4.0974	30
GRP	3	M1 Base	2.5092	2.9895	24

Total Cases = 91
Missing Cases = 6 OR 6.6 PCT.

Summaries of T6AVMD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-1.1766	4.2234	85
POSITION	1	Co Cmdr	-2.4013	5.7067	12
POSITION	2	Plt Ldrs	-2.6341	3.7790	39
POSITION	3	Other TCs	.9274	3.2505	34

Total Cases = 91
Missing Cases = 6 OR 6.6 PCT.

Summaries of T6AVMD
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-1.1766	4.2234	85
GRP	1	IVC2	-2.1306	3.3471	31
POSITION	1	Co Cmdr	-4.2460	3.4489	5
POSITION	2	Plt Ldrs	-3.3907	3.0850	14
POSITION	3	Other TCs	.2208	2.2122	12
GRP	2	CVC2	-3.1395	4.0974	30
POSITION	1	Co Cmdr	-4.4288	6.8299	4
POSITION	2	Plt Ldrs	-4.9654	2.7489	14
POSITION	3	Other TCs	-.5796	3.2576	12
GRP	3	M1 Base	2.5092	2.9895	24
POSITION	1	Co Cmdr	3.3767	4.3667	3
POSITION	2	Plt Ldrs	1.2959	2.5325	11
POSITION	3	Other TCs	3.5835	2.8737	10

Total Cases = 91
Missing Cases = 6 OR 6.6 PCT.

Physical Demand: Task 6 - Determine Location

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	730.71	76	9.61		
CONSTANT	14.35	1	14.35	1.49	.226
GRP(1)	6.59	1	6.59	.69	.410
GRP(2)	361.11	1	361.11	37.56	.000
POSITION	161.75	2	80.87	8.41	.001
GRP(1) BY POSITION	18.13	2	9.07	.94	.394
GRP(2) BY POSITION	58.81	2	29.40	3.06	.053

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	460.46	76	6.06		
SCENARIO	.26	1	.26	.04	.835
GRP(1) BY SCENARIO	11.48	1	11.48	1.89	.173
GRP(2) BY SCENARIO	4.33	1	4.33	.71	.401
POSITION BY SCENARIO	1.98	2	.99	.16	.850
GRP(1) BY POSITION BY SCENARIO	13.74	2	6.87	1.13	.327
GRP(2) BY POSITION BY SCENARIO	17.26	2	8.63	1.42	.247

Task 6 - Determine Location

Cell Means and Standard Deviations
Variable .. T6DFPD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-2.782	2.703	5	-6.138	.574
POSITION	Plt Ldrs	-1.963	2.758	14	-3.555	-.371
POSITION	Other TC	-1.531	3.054	12	-3.471	.409
GRP	CVC2					
POSITION	Co Cmdr	-1.692	1.009	4	-3.298	-.087
POSITION	Plt Ldrs	-3.630	3.031	14	-5.380	-1.880
POSITION	Other TC	-.447	.944	12	-1.047	.152
GRP	M1 Base					
POSITION	Co Cmdr	6.590	4.160	3	-3.745	16.925
POSITION	Plt Ldrs	.026	2.965	11	-1.965	2.018
POSITION	Other TC	1.983	3.835	10	-.760	4.726
For entire sample		-.974	3.495	85	-1.728	-.221

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Variable .. T6DFPD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-.960	2.528	5	-4.099	2.179
POSITION	Plt Ldrs	-2.168	2.630	14	-3.686	-.650
POSITION	Other TC	.855	3.032	12	-1.072	2.782
GRP	CVC2					
POSITION	Co Cmdr	-1.320	4.173	4	-7.960	5.320
POSITION	Plt Ldrs	-3.741	2.890	14	-5.410	-2.073
POSITION	Other TC	-.881	1.526	12	-1.850	.089
GRP	M1 Base					
POSITION	Co Cmdr	3.407	3.326	3	-4.855	11.669
POSITION	Plt Ldrs	1.246	3.452	11	-1.073	3.565
POSITION	Other TC	.938	1.796	10	-.347	2.223
For entire sample		-.704	3.243	85	-1.403	-.004

Physical Demand: Task 6 - Determine Location

Summaries of T6AVPD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.8391	2.8648	85
GRP	1	IVC2	-1.3653	1.9013	31
GRP	2	CVC2	-2.1865	2.4903	30
GRP	3	M1 Base	1.5250	2.9776	24

Total Cases = 91
Missing Cases = 6 OR 6.6 PCT.

Summaries of T6AVPD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.8391	2.8648	85
POSITION	1	Co Cmdr	-.0321	3.5860	12
POSITION	2	Plt Ldrs	-1.8850	3.1329	39
POSITION	3	Other TCs	.0759	1.7057	34

Total Cases = 91
Missing Cases = 6 OR 6.6 PCT.

Summaries of T6AVPD
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.8391	2.8648	85
GRP	1	IVC2	-1.3653	1.9013	31
POSITION	1	Co Cmdr	-1.8710	1.2674	5
POSITION	2	Plt Ldrs	-2.0654	2.1733	14
POSITION	3	Other TCs	-.3379	1.3421	12
GRP	2	CVC2	-2.1865	2.4903	30
POSITION	1	Co Cmdr	-1.5062	2.2371	4
POSITION	2	Plt Ldrs	-3.6857	2.7642	14
POSITION	3	Other TCs	-.6642	.6304	12
GRP	3	M1 Base	1.5250	2.9776	24
POSITION	1	Co Cmdr	4.9983	3.0412	3
POSITION	2	Plt Ldrs	.6364	3.1060	11
POSITION	3	Other TCs	1.4605	2.2119	10

Total Cases = 91
Missing Cases = 6 OR 6.6 PCT.

Time Demand: Task 6 - Determine Location

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	1845.27	76	24.28		
CONSTANT	307.15	1	307.15	12.65	.001
GRP(1)	2.46	1	2.46	.10	.751
GRP(2)	666.71	1	666.71	27.46	.000
POSITION	339.05	2	169.52	6.98	.002
GRP(1) BY POSITION	11.99	2	5.99	.25	.782
GRP(2) BY POSITION	69.26	2	34.63	1.43	.247

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	714.40	76	9.40		
SCENARIO	.00	1	.00	.00	.988
GRP(1) BY SCENARIO	26.17	1	26.17	2.78	.099
GRP(2) BY SCENARIO	.33	1	.33	.04	.851
POSITION BY SCENARIO	20.59	2	10.30	1.10	.340
GRP(1) BY POSITION BY SCENARIO	32.49	2	16.25	1.73	.184
GRP(2) BY POSITION BY SCENARIO	15.34	2	7.67	.82	.446

Mental Demand: Task 6 - Determine Location

Cell Means and Standard Deviations
Variable .. T6DFTD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-5.726	3.989	5	-10.679	-.773
POSITION	Plt Ldrs	-4.287	4.094	14	-6.651	-1.923
POSITION	Other TC	-1.873	3.177	12	-3.891	.146
GRP	CVC2					
POSITION	Co Cmdr	-3.352	4.936	4	-11.207	4.502
POSITION	Plt Ldrs	-5.741	3.274	14	-7.632	-3.851
POSITION	Other TC	-.605	5.312	12	-3.980	2.770
GRP	MI Base					
POSITION	Co Cmdr	3.077	5.104	3	-9.603	15.756
POSITION	Plt Ldrs	.535	5.273	11	-3.007	4.078
POSITION	Other TC	3.894	4.275	10	.836	6.952
For entire sample		-1.860	5.202	85	-2.982	-.738

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Variable .. T6OFTD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-4.198	3.645	5	-8.724	.328
POSITION	Plt Ldrs	-4.356	4.307	14	-6.842	-1.869
POSITION	Other TC	.634	2.971	12	-1.254	2.522
GRP	CVC2					
POSITION	Co Cmdr	-5.128	6.776	4	-15.910	5.655
POSITION	Plt Ldrs	-5.199	3.975	14	-7.494	-2.904
POSITION	Other TC	-1.712	3.785	12	-4.116	.693
GRP	MI Base					
POSITION	Co Cmdr	1.467	2.788	3	-5.460	8.393
POSITION	Plt Ldrs	3.015	3.921	11	.381	5.648
POSITION	Other TC	1.472	3.132	10	-.768	3.712
For entire sample		-1.599	4.803	85	-2.635	-.563

Time Demand: Task 6 - Determine Location
Summaries of T6AVTD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-1.7295	4.4809	85
GRP	1	IVC2	-2.9916	3.6751	31
GRP	2	CVC2	-3.5813	4.2429	30
GRP	3	M1 Base	2.2154	3.1866	24

Total Cases = 91
Missing Cases = 6 OR 6.6 PCT.

Summaries of T6AVTD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-1.7295	4.4809	85
POSITION	1	Co Cmdr	-2.9129	4.9725	12
POSITION	2	Plt Ldrs	-3.0142	4.7059	39
POSITION	3	Other TCs	.1618	3.3495	34

Total Cases = 91
Missing Cases = 6 OR 6.6 PCT.

Summaries of T6AVTD
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-1.7295	4.4809	85
GRP	1	IVC2	-2.9916	3.6751	31
POSITION	1	Co Cmdr	-4.9620	2.7536	5
POSITION	2	Plt Ldrs	-4.3214	4.1083	14
POSITION	3	Other TCs	-.6192	1.9938	12
GRP	2	CVC2	-3.5813	4.2429	30
POSITION	1	Co Cmdr	-4.2400	5.8449	4
POSITION	2	Plt Ldrs	-5.4700	2.8548	14
POSITION	3	Other TCs	-1.1583	4.1725	12
GRP	3	M1 Base	2.2154	3.1866	24
POSITION	1	Co Cmdr	2.2717	3.9040	3
POSITION	2	Plt Ldrs	1.7750	3.9437	11
POSITION	3	Other TCs	2.6830	2.1911	10

Total Cases = 91
Missing Cases = 6 OR 6.6 PCT.

Effort: Task 6 - Determine Location

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	1577.50	76	20.76		
CONSTANT	295.30	1	295.30	14.23	.000
GRP(1)	.72	1	.72	.03	.852
GRP(2)	384.90	1	384.90	18.54	.000
POSITION	65.03	2	32.52	1.57	.215
GRP(1) BY POSITION	17.76	2	8.88	.43	.653
GRP(2) BY POSITION	37.35	2	18.68	.90	.411

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	729.83	76	9.60		
SCENARIO	2.16	1	2.16	.22	.637
GRP(1) BY SCENARIO	3.01	1	3.01	.31	.578
GRP(2) BY SCENARIO	1.01	1	1.01	.10	.747
POSITION BY SCENARIO	35.73	2	17.86	1.86	.163
GRP(1) BY POSITION B Y SCENARIO	47.84	2	23.92	2.49	.090
GRP(2) BY POSITION B Y SCENARIO	.68	2	.34	.04	.965

Task 6 - Determine Location

Cell Means and Standard Deviations

Variable .. T6DFEF

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-4.574	3.138	5	-8.471	-.677
POSITION	Plt Ldrs	-3.028	4.764	14	-5.778	-.277
POSITION	Other TC	-2.427	3.551	12	-4.683	-.172
GRP	CVC2					
POSITION	Co Cmdr	-3.390	5.645	4	-12.373	5.593
POSITION	Plt Ldrs	-5.176	2.503	14	-6.621	-3.731
POSITION	Other TC	-.919	4.700	12	-3.906	2.067
GRP	M1 Base					
POSITION	Co Cmdr	1.423	3.309	3	-6.797	9.644
POSITION	Plt Ldrs	.638	4.018	11	-2.061	3.337
POSITION	Other TC	2.508	3.781	10	-.197	5.213
For entire sample		-1.824	4.539	85	-2.803	-.845

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Variable .. T6DFEF

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-4.028	3.507	5	-8.382	.326
POSITION	Plt Ldrs	-2.825	3.449	14	-4.816	-.834
POSITION	Other TC	-.512	1.948	12	-1.749	.726
GRP	CVC2					
POSITION	Co Cmdr	-3.230	9.276	4	-17.990	11.530
POSITION	Plt Ldrs	-3.129	4.925	14	-5.973	-.285
POSITION	Other TC	-2.598	3.273	12	-4.677	-.518
GRP	M1 Base					
POSITION	Co Cmdr	1.730	1.152	3	-1.132	4.592
POSITION	Plt Ldrs	2.049	3.068	11	-.012	4.110
POSITION	Other TC	-.048	2.759	10	-2.022	1.926
For entire sample		-1.488	4.119	85	-2.376	-.600

Effort: Task 6 - Determine Location

Summaries of T6AVEF
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-1.6562	3.7140	85
GRP	1	IVC2	-2.5842	3.2578	31
GRP	2	CVC2	-3.0825	3.5986	30
GRP	3	M1 Base	1.3254	2.6674	24

Total Cases = 91
Missing Cases = 6 OR 6.6 PCT.

Summaries of T6AVEF
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-1.6562	3.7140	85
POSITION	1	Co Cmdr	-2.5012	4.9270	12
POSITION	2	Plt Ldrs	-2.1622	3.9384	39
POSITION	3	Other TCs	-.7775	2.7930	34

Total Cases = 91
Missing Cases = 6 OR 6.6 PCT.

Frustration: Task 6 - Determine Location

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	1825.62	76	24.02		
CONSTANT	74.75	1	74.75	3.11	.082
GRP(1)	6.79	1	6.79	.28	.597
GRP(2)	694.47	1	694.47	28.91	.000
POSITION	107.55	2	53.77	2.24	.114
GRP(1) BY POSITION	14.56	2	7.28	.30	.739
GRP(2) BY POSITION	22.37	2	11.18	.47	.630

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	692.69	76	9.11		
SCENARIO	1.03	1	1.03	.11	.738
GRP(1) BY SCENARIO	1.01	1	1.01	.11	.740
GRP(2) BY SCENARIO	4.44	1	4.44	.49	.487
POSITION BY SCENARIO	18.86	2	9.43	1.03	.360
GRP(1) BY POSITION B Y SCENARIO	25.41	2	12.70	1.39	.254
GRP(2) BY POSITION B Y SCENARIO	13.32	2	6.66	.73	.485

Task 6 - Determine Location

Cell Means and Standard Deviations
Variable .. T6DFFR

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-2.996	4.947	5	-9.138	3.146
POSITION	Plt Ldrs	-2.441	4.381	14	-4.970	.089
POSITION	Other TC	-1.993	2.896	12	-3.834	-.153
GRP	CVC2					
POSITION	Co Cmdr	-1.432	7.383	4	-13.180	10.315
POSITION	Plt Ldrs	-4.959	3.053	14	-6.721	-3.196
POSITION	Other TC	-2.025	3.784	12	-4.429	.379
GRP	MI Base					
POSITION	Co Cmdr	4.333	6.512	3	-11.844	20.510
POSITION	Plt Ldrs	.604	4.673	11	-2.535	3.743
POSITION	Other TC	3.171	3.968	10	.332	6.010
For entire sample		-1.426	4.747	85	-2.449	-.402

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Variable .. T6OFFR

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-3.438	3.726	5	-8.065	1.189
POSITION	Plt Ldrs	-3.353	2.504	14	-4.799	-1.907
POSITION	Other TC	-.230	1.643	12	-1.274	.814
GRP	CVC2					
POSITION	Co Cmdr	-3.840	10.017	4	-19.779	12.099
POSITION	Plt Ldrs	-3.764	4.666	14	-6.458	-1.070
POSITION	Other TC	-1.643	3.591	12	-3.924	.639
GRP	MI Base					
POSITION	Co Cmdr	4.163	2.223	3	-1.359	9.685
POSITION	Plt Ldrs	3.483	4.246	11	.630	6.335
POSITION	Other TC	2.505	3.475	10	.019	4.991
For entire sample		-.927	4.723	85	-1.946	.092

Frustration: Task 6 - Determine Location

Summaries of T6AVFR
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-1.1763	4.2177	85
GRP	1	IVC2	-2.2574	2.8977	31
GRP	2	CVC2	-3.1202	4.1292	30
GRP	3	M1 Base	2.6500	3.2766	24

Total Cases = 91
Missing Cases = 6 OR 6.6 PCT.

Summaries of T6AVFR
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-1.1763	4.2177	85
POSITION	1	Co Cmdr	-1.1571	6.4177	12
POSITION	2	Plt Ldrs	-2.0291	4.0700	39
POSITION	3	Other TCs	-.2049	3.2627	34

Total Cases = 91
Missing Cases = 6 OR 6.6 PCT.

Appendix G2
Direct a Scheme of Maneuver

Variable or term	Description
GRP(1)	ANOVA factor comparing CVCC with M1 Baseline
GRP(2)	ANOVA factor comparing CVCC with IVCC
T8DVN	Total workload deviation score--mean across scenarios
T8OFDVN and T8DFDVN	Not tested separately because of low n
T8AVMD	Mental Demand subscale deviation score--mean across scenarios
T8AVPD	Physical Demand subscale deviation score--mean across scenarios
T8AVTD	Time Demand subscale deviation score--mean across scenarios
T8AVEF	Effort subscale deviation score--mean across scenarios
T8AVFR	Frustration subscale deviation score--mean across scenarios

Deviation Scores: Task 8 - Direct Scheme of Maneuver

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T8DVN using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	4094.81	40	102.37		
CONSTANT	49.61	1	49.61	.48	.490
GRP(1)	249.89	1	249.89	2.44	.126
GRP(2)	53.88	1	53.88	.53	.472
POSITION	4.56	1	4.56	.04	.834
GRP(1) BY POSITION	112.46	1	112.46	1.10	.301
GRP(2) BY POSITION	892.54	1	892.54	8.72	.005

Cell Means and Standard Deviations

Variable .. T8DVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	7.519	11.055	4	-10.072	25.110
POSITION	Plt Ldrs	5.295	7.537	14	.944	9.647
GRP	CVC2					
POSITION	Co Cadr	5.468	12.640	5	-10.227	21.163
POSITION	Plt Ldrs	-5.115	6.453	10	-9.732	-.499
GRP	M1 Base					
POSITION	Co Cadr	-10.467	23.580	3	-69.045	48.111
POSITION	Plt Ldrs	4.534	9.797	10	-2.475	11.542
For entire sample		2.051	11.021	46	-1.222	5.323

Mental Demand: Task 8 - Direct a Scheme of Maneuver

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for TBAVMD using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	207.95	40	5.20		
CONSTANT	17.57	1	17.57	3.38	.073
GRP(1)	24.14	1	24.14	4.64	.037
GRP(2)	2.79	1	2.79	.54	.468
POSITION	1.01	1	1.01	.19	.661
GRP(1) BY POSITION	.39	1	.39	.08	.785
GRP(2) BY POSITION	11.83	1	11.83	2.27	.139

Cell Means and Standard Deviations

Variable .. TBAVMD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	2.754	2.109	5	.135	5.373
POSITION	Plt Ldrs	1.756	1.488	14	.897	2.615
GRP	CVC2					
POSITION	Co Cmdr	.571	3.521	4	-5.031	6.173
POSITION	Plt Ldrs	.066	1.399	10	-.935	1.066
GRP	M1 Base					
POSITION	Co Cmdr	-1.690	6.242	3	-17.196	13.816
POSITION	Plt Ldrs	.848	1.784	10	-.428	2.124
For entire sample		.972	2.416	46	.254	1.689

Mental Demand: Task 8 - Direct a Scheme of Maneuver

Summaries of TBAVMD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.9717	2.4161	46
GRP	1	IVC2	2.0184	1.6709	19
GRP	2	CVC2	.2100	2.0666	14
GRP	3	M1 Base	.2623	3.1812	13

Total Cases = 46

Summaries of TBAVMD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.9717	2.4161	46
POSITION	1	Co Cadr	.9154	3.9386	12
POSITION	2	Plt Ldrs	.9916	1.6697	34

Total Cases = 46

Summaries of TBAVMD
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.9717	2.4161	46
GRP	1	IVC2	2.0184	1.6709	19
POSITION	1	Co Cadr	2.7540	2.1091	5
POSITION	2	Plt Ldrs	1.7557	1.4881	14
GRP	2	CVC2	.2100	2.0666	14
POSITION	1	Co Cadr	.5713	3.5205	4
POSITION	2	Plt Ldrs	.0655	1.3986	10
GRP	3	M1 Base	.2623	3.1812	13
POSITION	1	Co Cadr	-1.6900	6.2419	3
POSITION	2	Plt Ldrs	.8480	1.7843	10

Total Cases = 46

Physical Demand: Task 8 - Direct a Scheme of Maneuver

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for TBAVPD using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	104.81	40	2.62		
CONSTANT	.25	1	.25	.10	.759
GRP(1)	3.51	1	3.51	1.34	.254
GRP(2)	1.14	1	1.14	.43	.514
POSITION	13.65	1	13.65	5.21	.028
GRP(1) BY POSITION	1.80	1	1.80	.69	.413
GRP(2) BY POSITION	25.83	1	25.83	9.86	.003

Cell Means and Standard Deviations

Variable .. TBAVPD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	.329	1.592	5	-1.536	2.194
POSITION	Plt Ldrs	.799	1.509	14	-.068	1.665
GRP	CVC2					
POSITION	Co Cmdr	.119	2.405	4	-3.709	3.946
POSITION	Plt Ldrs	-.468	1.279	10	-1.383	.447
GRP	M1 Base					
POSITION	Co Cmdr	-2.602	1.283	3	-5.789	.586
POSITION	Plt Ldrs	1.310	1.861	10	-.022	2.641
For entire sample		.302	1.824	46	-.239	.844

Summaries of TBAVPD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3024	1.8243	46
GRP	1	IVC2	.6750	1.4738	19
GRP	2	CVC2	-.3004	1.5946	14
GRP	3	M1 Base	.4069	2.4109	13

Total Cases = 46

Summaries of TBAVPD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3024	1.8243	46
POSITION	1	Co Cmdr	-.4737	2.0865	12
POSITION	2	Plt Ldrs	.5763	1.6706	34

Total Cases = 46

Summaries of TBAVPD
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3024	1.8243	46
GRP	1	IVC2	.6750	1.4738	19
POSITION	1	Co Cmdr	.3290	1.5023	5
POSITION	2	Plt Ldrs	.7986	1.5002	14
GRP	2	CVC2	-.3004	1.5946	14
POSITION	1	Co Cmdr	.1188	2.4053	4
POSITION	2	Plt Ldrs	-.4680	1.2787	10
GRP	3	M1 Base	.4069	2.4109	13
POSITION	1	Co Cmdr	-2.6017	1.2832	3
POSITION	2	Plt Ldrs	1.3095	1.8606	10

Total Cases = 46

Time Demand: Task 8 - Direct a Scheme of Maneuver

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for TBAVTD using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	344.26	40	8.61		
CONSTANT	.05	1	.05	.01	.938
GRP(1)	39.90	1	39.90	4.64	.037
GRP(2)	1.70	1	1.70	.20	.659
POSITION	.81	1	.81	.09	.760
GRP(1) BY POSITION	1.53	1	1.53	.18	.676
GRP(2) BY POSITION	35.61	1	35.61	4.14	.049

Cell Means and Standard Deviations

Variable .. TBAVTD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	2.138	2.372	5	-.807	5.083
POSITION	Plt Ldrs	.718	2.295	14	-.607	2.043
GRP	CVC2					
POSITION	Co Cmdr	.135	2.441	4	-3.749	4.019
POSITION	Plt Ldrs	-2.258	2.673	10	-4.171	-.346
GRP	M1 Base					
POSITION	Co Cmdr	-1.928	7.595	3	-20.794	16.938
POSITION	Plt Ldrs	.960	2.488	10	-.820	2.740
For entire sample		.055	3.147	46	-.880	.989

Time Demand: Task 8 - Direct a Scheme of Maneuver

Summaries of TBAVTD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.0547	3.1470	46
GRP	1	IVC2	1.0918	2.3383	19
GRP	2	CVC2	-1.5746	2.7536	14
GRP	3	M1 Base	.2935	3.9825	13

Total Cases = 46

Summaries of TBAVTD
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.0547	3.1470	46
GRP	1	IVC2	1.0918	2.3383	19
POSITION	1	Co Cmdr	2.1380	2.3715	5
POSITION	2	Plt Ldrs	.7182	2.2953	14
GRP	2	CVC2	-1.5746	2.7536	14
POSITION	1	Co Cmdr	.1350	2.4412	4
POSITION	2	Plt Ldrs	-2.2585	2.6733	10
GRP	3	M1 Base	.2935	3.9825	13
POSITION	1	Co Cmdr	-1.9283	7.5945	3
POSITION	2	Plt Ldrs	.9600	2.4882	10

Total Cases = 46

Summaries of TBAVTD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.0547	3.1470	46
POSITION	1	Co Cmdr	.4538	4.1269	12
POSITION	2	Plt Ldrs	-.0862	2.7838	34

Total Cases = 46

Effort: Task B - Direct a Scheme of Maneuver

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T8AVEF using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	213.68	40	5.34		
CONSTANT	15.03	1	15.03	2.81	.101
GRP(1)	4.98	1	4.98	.93	.340
GRP(2)	.08	1	.08	.02	.902
POSITION	7.17	1	7.17	1.34	.254
GRP(1) BY POSITION	7.38	1	7.38	1.38	.247
GRP(2) BY POSITION	9.82	1	9.82	1.84	.183

Cell Means and Standard Deviations

Variable .. T8AVEF

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	1.499	2.144	5	-1.162	4.160
POSITION	Plt Ldrs	1.086	2.302	14	-.244	2.415
GRP	CVC2					
POSITION	Co Cadr	1.690	2.640	4	-2.511	5.891
POSITION	Plt Ldrs	-.865	2.342	10	-2.540	.810
GRP	M1 Base					
POSITION	Co Cadr	.177	1.967	3	-4.710	5.064
POSITION	Plt Ldrs	.395	2.318	10	-1.263	2.053
For entire sample		.550	2.348	46	-.148	1.247

Effort: Task 8 - Direct a Scheme of Maneuver

Summaries of TBAVEF
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5497	2.3479	46
GRP	1	IVC2	1.1945	2.2100	19
GRP	2	CVC2	-.1350	2.6155	14
GRP	3	M1 Base	.3446	2.1645	13

Total Cases = 46

Summaries of TBAVEF
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5497	2.3479	46
POSITION	1	Co Cadr	1.2321	2.1651	12
POSITION	2	Plt Ldrs	.3088	2.3929	34

Total Cases = 46

Effort: Task 8 - Direct a Scheme of Maneuver

Summaries of TBAVEF
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5497	2.3479	46
GRP	1	IVC2	1.1945	2.2100	19
POSITION	1	Co Cadr	1.4990	2.1435	5
POSITION	2	Plt Ldrs	1.0857	2.3023	14
GRP	2	CVC2	-.1350	2.6155	14
POSITION	1	Co Cadr	1.6900	2.6399	4
POSITION	2	Plt Ldrs	-.8650	2.3422	10
GRP	3	M1 Base	.3446	2.1645	13
POSITION	1	Co Cadr	.1767	1.9673	3
POSITION	2	Plt Ldrs	.3950	2.3183	10

Total Cases = 46

Frustration: Task 8 - Direct a Scheme of Maneuver

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T8AVFR using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	261.03	40	6.53		
CONSTANT	.27	1	.27	.04	.841
GRP(1)	26.88	1	26.88	4.12	.049
GRP(2)	4.80	1	4.80	.74	.396
POSITION	1.80	1	1.80	.28	.602
GRP(1) BY POSITION	.90	1	.90	.14	.712
GRP(2) BY POSITION	62.40	1	62.40	9.56	.004

Cell Means and Standard Deviations

Variable .. T8AVFR

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	2.283	2.244	5	-.504	5.070
POSITION	Plt Ldrs	.911	2.034	14	-.263	2.086
GRP	CVC2					
POSITION	Co Cadr	.614	2.566	4	-3.469	4.696
POSITION	Plt Ldrs	-1.506	1.825	10	-2.812	-.201
GRP	MI Base					
POSITION	Co Cadr	-3.852	6.740	3	-20.594	12.891
POSITION	Plt Ldrs	1.020	2.274	10	-.607	2.646
For entire sample		.222	2.889	46	-.636	1.080

Frustration: Task 8 - Direct a Scheme of Maneuver

Summaries of TBAVFR
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.2218	2.8889	46
GRP	1	IVC2	1.2724	2.1193	19
GRP	2	CVC2	-.9007	2.1939	14
GRP	3	M1 Base	-.1046	4.0015	13

Total Cases = 46

Frustration: Task 8 - Direct a Scheme of Maneuver

Summaries of TBAVFR
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.2218	2.8889	46
POSITION	1	Co Cmdr	.1929	4.2892	12
POSITION	2	Plt Ldrs	.2321	2.2908	34

Total Cases = 46

Summaries of TBAVFR
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.2218	2.8889	46
GRP	1	IVC2	1.2724	2.1193	19
POSITION	1	Co Cmdr	2.2830	2.2442	5
POSITION	2	Plt Ldrs	.9114	2.0337	14
GRP	2	CVC2	-.9007	2.1939	14
POSITION	1	Co Cmdr	.6138	2.5657	4
POSITION	2	Plt Ldrs	-1.5065	1.8251	10
GRP	3	M1 Base	-.1046	4.0015	13
POSITION	1	Co Cmdr	-3.8517	6.7397	3
POSITION	2	Plt Ldrs	1.0195	2.2740	10

Total Cases = 46

Appendix G3
Monitor/Correct Route Progress

Variable or term	Description
GRP(1)	ANOVA factor comparing CVCC with M1 Baseline
GRP(2)	ANOVA factor comparing CVCC with IVCC
T9DFDVN	Total workload deviation score for defensive scenario
T9OFDVN	Total workload deviation score for offensive scenario
TSK9DVN	Total workload deviation score-mean across scenarios
T9DFMD	Mental Demand subscale deviation score for defensive scenario
T9OFMD	Mental Demand subscale deviation score for offensive scenario
T9AVMD	Mental Demand subscale deviation score--mean across scenarios
T9DFPD	Physical Demand subscale deviation score for defensive scenario
T9OFPD	Physical Demand subscale deviation score for offensive scenario
T9AVPD	Physical Demand subscale deviation score--mean across scenarios
T9DFTD	Time Demand subscale deviation score for defensive scenario
T9OFTD	Time Demand subscale deviation score for offensive scenario
T9AVTD	Time Demand subscale deviation score--mean across scenarios
T9DFEF	Effort subscale deviation score for defensive scenario
T9OFEF	Effort subscale deviation score for offensive scenario
T9AVEF	Effort subscale deviation score--mean across scenarios
T9DFFR	Frustration subscale deviation score for defensive scenario
T9OFFR	Frustration subscale deviation score for offensive scenario
T9AVFR	Frustration subscale deviation score--mean across scenarios

Multiple Regression variable	Description
T9WL	Total workload rating for task
CMT9WL1	Mental Demand subscale score for task
CMT9WL2	Physical Demand subscale score for task
CMT9WL3	Time Demand subscale score for task
CMT9WL5	Effort subscale score for task
CMT9WL6	Frustration subscale score for task

Deviation Scores: Task 9 - Monitor/Correct Route Progress

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	19996.51	60	333.28		
CONSTANT	35.84	1	35.84	.11	.744
GRP(1)	98.54	1	98.54	.30	.589
GRP(2)	1376.73	1	1376.73	4.13	.047
POSITION	864.03	2	432.01	1.30	.281
GRP(1) BY POSITION	455.10	2	227.55	.68	.509
GRP(2) BY POSITION	174.06	2	87.03	.26	.771

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	4270.60	60	71.18		
SCENARIO	71.40	1	71.40	1.00	.321
GRP(1) BY SCENARIO	313.19	1	313.19	4.40	.040
GRP(2) BY SCENARIO	19.18	1	19.18	.27	.606
POSITION BY SCENARIO	15.10	2	7.55	.11	.900
GRP(1) BY POSITION B Y SCENARIO	38.84	2	19.42	.27	.762
GRP(2) BY POSITION B Y SCENARIO	22.13	2	11.06	.16	.856

"Deviation Scores: Task 9 - Monitor/Correct Route Progress".

Cell Means and Standard Deviations
Variable .. T9DFDVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-1.765	11.172	3	-29.519	25.989
POSITION	Plt Ldrs	-1.425	17.455	13	-11.973	9.123
POSITION	Other TC	2.126	12.346	12	-5.718	9.971
GRP	CVC2					
POSITION	Co Cmdr	-4.356	15.935	4	-29.712	20.999
POSITION	Plt Ldrs	-12.023	14.042	13	-20.508	-3.538
POSITION	Other TC	-3.677	14.182	8	-15.534	8.179
GRP	M1 Base					
POSITION	Co Cmdr	4.687	.000	1		
POSITION	Plt Ldrs	5.483	13.753	9	-5.089	16.054
POSITION	Other TC	8.352	7.729	6	.241	16.463
For entire sample		-1.410	14.682	69	-4.937	2.117

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Variable .. T9DFDVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-7.714	18.848	3	-54.536	39.107
POSITION	Plt Ldrs	-2.160	14.134	13	-10.701	6.381
POSITION	Other TC	1.242	10.336	12	-5.325	7.809
GRP	CVC2					
POSITION	Co Cmdr	1.754	15.397	4	-22.746	26.254
POSITION	Plt Ldrs	-8.022	15.869	13	-17.612	1.568
POSITION	Other TC	2.978	16.810	8	-11.075	17.031
GRP	M1 Base					
POSITION	Co Cmdr	13.062	.000	1		
POSITION	Plt Ldrs	5.067	15.676	9	-6.982	17.117
POSITION	Other TC	9.013	8.686	6	-.102	18.128
For entire sample		.043	14.554	69	-3.453	3.539

Deviation Scores: Task 9 - Monitor/Correct Route Progress

Summaries of TSK9DVN

By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.6835	13.3969	69
GRP	1	IVC2	-.6182	12.2951	28
GRP	2	CVC2	-5.5318	14.5662	25
GRP	3	M1 Base	6.7779	10.1720	16

Total Cases = 91
Missing Cases = 22 OR 24.2 PCT.

Summaries of TSK9DVN
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.6835	13.3969	69
GRP	1	IVC2	-.6182	12.2951	28
POSITION	1	Co Cmdr	-4.7395	13.3582	3
POSITION	2	Plt Ldrs	-1.7924	14.4302	13
POSITION	3	Other TCs	1.6841	9.9701	12
GRP	2	CVC2	-5.5318	14.5662	25
POSITION	1	Co Cmdr	-1.3011	15.2801	4
POSITION	2	Plt Ldrs	-10.0225	13.7413	13
POSITION	3	Other TCs	-.3497	15.0110	8
GRP	3	M1 Base	6.7779	10.1720	16
POSITION	1	Co Cmdr	8.8750	.0000	1
POSITION	2	Plt Ldrs	5.2750	12.9146	9
POSITION	3	Other TCs	8.6827	5.8523	6

Total Cases = 91
Missing Cases = 22 OR 24.2 PCT.

**** MULTIPLE REGRESSION ****

Equation Number 1 Dependent Variable.. T9WL

Beginning Block Number 1. Method: Stepwise

Step	MultR	Rsq	AdjRsq	F(Eqn)	SigF	RsqCh	FCh	SigCh		Variable	BetaIn	Correl
1	.8963	.8033	.7996	216.415	.000	.8033	216.415	.000	In:	CMT9WL3	.8963	.8963
2	.9620	.9255	.9226	322.863	.000	.1222	85.259	.000	In:	CMT9WL5	.4890	.8766
3	.9758	.9521	.9493	337.921	.000	.0266	28.354	.000	In:	CMT9WL2	.1873	.5914

Variable(s) Entered on Step Number 3.. CMT9WL2

Multiple R	.97576
R Square	.95210
Adjusted R Square	.94928
Standard Error	4.12982

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	3	17290.17201	5763.39067
Residual	51	869.82799	17.05545

F = 337.92075 Signif F = .0000

Listwise Deletion of Missing Data

N of Cases = 55

Correlation:

	T9WL	CMT9WL1	CMT9WL2	CMT9WL3	CMT9WL5	CMT9WL6
T9WL	1.000	.858	.591	.896	.877	.831
CMT9WL1	.858	1.000	.461	.749	.711	.547
CMT9WL2	.591	.461	1.000	.381	.487	.350
CMT9WL3	.896	.749	.381	1.000	.699	.739
CMT9WL5	.877	.711	.487	.699	1.000	.652
CMT9WL6	.831	.547	.350	.739	.652	1.000

Mental Demand: Task 9 - Monitor/Correct Route Progress

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	974.77	60	16.25		
CONSTANT	.01	1	.01	.00	.981
GRP(1)	11.28	1	11.28	.69	.408
GRP(2)	50.71	1	50.71	3.12	.082
POSITION	62.47	2	31.23	1.92	.155
GRP(1) BY POSITION	20.76	2	10.38	.64	.531
GRP(2) BY POSITION	5.91	2	2.96	.18	.834

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	318.41	60	5.31		
SCENARIO	1.16	1	1.16	.22	.642
GRP(1) BY SCENARIO	8.67	1	8.67	1.63	.206
GRP(2) BY SCENARIO	.01	1	.01	.00	.969
POSITION BY SCENARIO	2.10	2	1.05	.20	.821
GRP(1) BY POSITION BY SCENARIO	2.30	2	1.15	.22	.806
GRP(2) BY POSITION BY SCENARIO	2.80	2	1.40	.26	.769

Mental Demand: Task 9 - Monitor/Correct Route Progress

Cell Means and Standard Deviations
Variable .. T9DFMD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	.907	2.677	4	-3.352	5.167
POSITION	Plt Ldrs	-.897	3.909	13	-3.259	1.465
POSITION	Other TC	.303	3.550	12	-1.952	2.559
GRP	CVC2					
POSITION	Co Cadr	-1.713	6.057	3	-16.761	13.334
POSITION	Plt Ldrs	-2.577	2.905	13	-4.332	-.822
POSITION	Other TC	.271	2.481	8	-1.803	2.346
GRP	M1 Base					
POSITION	Co Cadr	-.190	.000	1		
POSITION	Plt Ldrs	.868	2.778	9	-1.267	3.003
POSITION	Other TC	1.997	1.662	6	.253	3.741
For entire sample		-.308	3.368	69	-1.117	.501

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Variable .. T9DFMD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-1.152	2.849	4	-5.687	3.382
POSITION	Plt Ldrs	-.306	4.482	13	-3.015	2.402
POSITION	Other TC	-.228	1.566	12	-1.222	.767
GRP	CVC2					
POSITION	Co Cadr	-1.330	6.134	3	-16.569	13.909
POSITION	Plt Ldrs	-1.382	3.082	13	-3.245	.480
POSITION	Other TC	.741	2.468	8	-1.322	2.804
GRP	M1 Base					
POSITION	Co Cadr	1.620	.000	1		
POSITION	Plt Ldrs	.903	3.103	9	-1.482	3.289
POSITION	Other TC	2.372	3.320	6	-1.112	5.856
For entire sample		-.049	3.303	69	-.842	.745

Mental Demand: Task 9 - Monitor/Correct Route Progress

Summaries of T9AVMD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.1785	2.9358	69
GRP	1	IVC2	-.2709	2.7985	29
GRP	2	CVC2	-1.0938	3.1596	24
GRP	3	M1 Base	1.3619	2.2932	16

Total Cases = 91
Missing Cases = 22 OR 24.2 PCT.

Summaries of T9AVMD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.1785	2.9358	69
POSITION	1	Co Cadr	-.5425	3.6381	8
POSITION	2	Plt Ldrs	-.7310	3.1264	35
POSITION	3	Other TCs	.6773	2.2833	26

Total Cases = 91
Missing Cases = 22 OR 24.2 PCT.

Summaries of T9AVMD
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.1785	2.9358	69
GRP	1	IVC2	-.2709	2.7985	29
POSITION	1	Co Cadr	-.1225	2.0995	4
POSITION	2	Plt Ldrs	-.6015	3.6019	13
POSITION	3	Other TCs	.0379	2.0830	12
GRP	2	CVC2	-1.0938	3.1596	24
POSITION	1	Co Cadr	-1.5217	6.0936	3
POSITION	2	Plt Ldrs	-1.9796	2.6605	13
POSITION	3	Other TCs	.5062	2.3657	8
GRP	3	M1 Base	1.3619	2.2932	16
POSITION	1	Co Cadr	.7150	.0000	1
POSITION	2	Plt Ldrs	.8856	2.4417	9
POSITION	3	Other TCs	2.1842	2.2214	6

Total Cases = 91
Missing Cases = 22 OR 24.2 PCT.

Physical Demand: Task 9 - Monitor/Correct Route Progress

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	539.25	60	8.99		
CONSTANT	12.25	1	12.25	1.36	.248
GRP(1)	26.50	1	26.50	2.95	.091
GRP(2)	36.31	1	36.31	4.04	.049
POSITION	12.46	2	6.23	.69	.504
GRP(1) BY POSITION	10.68	2	5.34	.59	.555
GRP(2) BY POSITION	18.84	2	9.42	1.05	.357

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	368.80	60	6.15		
SCENARIO	2.17	1	2.17	.35	.554
GRP(1) BY SCENARIO	.25	1	.25	.04	.841
GRP(2) BY SCENARIO	.71	1	.71	.11	.736
POSITION BY SCENARIO	.08	2	.04	.01	.993
GRP(1) BY POSITION B Y SCENARIO	18.64	2	9.32	1.52	.228
GRP(2) BY POSITION B Y SCENARIO	.06	2	.03	.01	.995

Cell Means and Standard Deviations
Variable .. T9DFPD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	.148	.735	4	-1.022	1.317
POSITION	Plt Ldrs	1.102	3.012	13	-.718	2.922
POSITION	Other TC	.983	3.489	12	-1.233	3.200
GRP	CVC2					
POSITION	Co Cadr	.137	2.472	3	-6.005	6.278
POSITION	Plt Ldrs	-1.399	2.726	13	-3.047	.248
POSITION	Other TC	.300	1.567	8	-1.010	1.610
GRP	M1 Base					
POSITION	Co Cadr	2.940	.000	1		
POSITION	Plt Ldrs	.571	3.163	9	-1.860	3.002
POSITION	Other TC	.463	.829	6	-.406	1.333
For entire sample		.322	2.727	69	-.334	.977

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Variable .. T9OFPD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	1.685	4.266	4	-5.103	8.473
POSITION	Plt Ldrs	-.617	2.689	13	-2.242	1.008
POSITION	Other TC	.054	3.144	12	-1.944	2.052
GRP	CVC2					
POSITION	Co Cadr	-1.703	1.320	3	-4.982	1.575
POSITION	Plt Ldrs	-1.253	3.306	13	-3.251	.745
POSITION	Other TC	.195	1.316	8	-.905	1.295
GRP	M1 Base					
POSITION	Co Cadr	1.870	.000	1		
POSITION	Plt Ldrs	1.209	2.473	9	-.692	3.110
POSITION	Other TC	.697	1.777	6	-1.168	2.562
For entire sample		-.051	2.783	69	-.720	.617

Physical Demand: Task 9 - Monitor/Correct Route Progress

Summaries of T9AVPD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.1351	2.1552	[illegible]
GRP	-1	IVC2	.4497	2.2391	[illegible]
GRP	2	CVC2	-.7338	2.0119	[illegible]
GRP	3	M1 Base	.8684	1.8758	[illegible]

Total Cases = 91
Missing Cases = 22 OR 24.2 PCT.

Summaries of T9AVPD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.1351	2.1552	[illegible]
POSITION	1	Co Cmdr	.4650	2.1795	[illegible]
POSITION	2	Plt Ldrs	-.1737	2.4669	[illegible]
POSITION	3	Other TCs	.4494	1.6602	[illegible]

Total Cases = 91
Missing Cases = 22 OR 24.2 PCT.

Summaries of T9AVPD
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.1351	2.1552	[illegible]
GRP	1	IVC2	.4497	2.2391	[illegible]
POSITION	1	Co Cmdr	.9163	2.4766	[illegible]
POSITION	2	Plt Ldrs	.2423	2.2392	[illegible]
POSITION	3	Other TCs	.5188	2.3417	[illegible]
GRP	2	CVC2	-.7337	2.0119	[illegible]
POSITION	1	Co Cmdr	-.7833	1.6729	[illegible]
POSITION	2	Plt Ldrs	-1.3262	2.4640	[illegible]
POSITION	3	Other TCs	.2475	.5818	[illegible]
GRP	3	M1 Base	.8684	1.8758	[illegible]
POSITION	1	Co Cmdr	2.4050	.0000	[illegible]
POSITION	2	Plt Ldrs	.8900	2.3500	[illegible]
POSITION	3	Other TCs	.5800	1.0709	[illegible]

Total Cases = 91
Missing Cases = 22 OR 24.2 PCT.

Time Demand: Task 9 - Monitor/Correct Route Progress

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	1591.34	60	26.52		
CONSTANT	2.93	1	2.93	.11	.741
GRP(1)	6.45	1	6.45	.24	.624
GRP(2)	58.11	1	58.11	2.19	.144
POSITION	33.41	2	16.71	.63	.536
GRP(1) BY POSITION	20.39	2	10.20	.38	.683
GRP(2) BY POSITION	25.34	2	12.67	.48	.623

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	311.12	60	5.19		
SCENARIO	4.40	1	4.40	.85	.360
GRP(1) BY SCENARIO	23.02	1	23.02	4.44	.039
GRP(2) BY SCENARIO	5.03	1	5.03	.97	.329
POSITION BY SCENARIO	13.89	2	6.95	1.34	.270
GRP(1) BY POSITION B Y SCENARIO	26.76	2	13.38	2.58	.084
GRP(2) BY POSITION B Y SCENARIO	1.62	2	.81	.16	.856

"Time Demand: Task 9 - Monitor/Correct Route Progress".

Cell Means and Standard Deviations
Variable .. T9DFTD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-.133	2.382	4	-3.923	3.658
POSITION	Plt Ldrs	-1.363	4.219	13	-3.913	1.187
POSITION	Other TC	.388	3.598	12	-1.898	2.674
GRP	CVC2					
POSITION	Co Cmdr	-1.530	4.449	3	-12.583	9.523
POSITION	Plt Ldrs	-2.529	4.394	13	-5.184	.126
POSITION	Other TC	-2.092	4.418	8	-5.786	1.601
GRP	M1 Base					
POSITION	Co Cmdr	.310	.000	1		
POSITION	Plt Ldrs	1.979	3.295	9	-.554	4.511
POSITION	Other TC	.952	2.990	6	-2.186	4.089
For entire sample		-.637	3.979	69	-1.593	.319

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Variable .. T9OFTD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-2.210	3.231	4	-7.352	2.932
POSITION	Plt Ldrs	-.908	4.170	13	-3.429	1.612
POSITION	Other TC	.511	4.839	12	-2.564	3.586
GRP	CVC2					
POSITION	Co Cmdr	1.497	5.465	3	-12.080	15.073
POSITION	Plt Ldrs	-2.752	3.272	13	-4.729	-.775
POSITION	Other TC	.201	5.168	8	-4.119	4.522
GRP	M1 Base					
POSITION	Co Cmdr	.620	.000	1		
POSITION	Plt Ldrs	1.222	3.441	9	-1.422	3.867
POSITION	Other TC	2.227	2.120	6	.002	4.451
For entire sample		-.279	4.143	69	-1.274	.717

Time Demand: Task 9 - Monitor/Correct Route Progress

Summaries of T9AVTD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.4579	3.7222	69
GRP	1	IVC2	-.4847	3.7315	29
GRP	2	CVC2	-1.7477	3.8706	24
GRP	3	M1 Base	1.5253	2.6432	16

Total Cases = 91
Missing Cases = 22 OR 24.2 PCT.

Summaries of T9AVTD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.4579	3.7222	69
POSITION	1	Co Cmdr	-.5338	3.0494	8
POSITION	2	Plt Ldrs	-.9911	3.8369	35
POSITION	3	Other TCs	.2833	3.7534	26

Total Cases = 91
Missing Cases = 22 OR 24.2 PCT.

Summaries of T9AVTD
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.4579	3.7222	69
GRP	1	IVC2	-.4847	3.7315	29
POSITION	1	Co Cmdr	-1.1712	2.3090	4
POSITION	2	Plt Ldrs	-1.1358	3.9947	13
POSITION	3	Other TCs	.4496	3.8673	12
GRP	2	CVC2	-1.7477	3.8706	24
POSITION	1	Co Cmdr	-.0167	4.7787	3
POSITION	2	Plt Ldrs	-2.6408	3.3036	13
POSITION	3	Other TCs	-.9456	4.5266	8
GRP	3	M1 Base	1.5253	2.6432	16
POSITION	1	Co Cmdr	.4650	.0000	1
POSITION	2	Plt Ldrs	1.6006	3.2014	9
POSITION	3	Other TCs	1.5892	2.0787	6

Total Cases = 91
Missing Cases = 22 OR 24.2 PCT.

Effort: Task 9 - Monitor/Correct Route Progress

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	1251.20	60	20.85		
CONSTANT	2.61	1	2.61	.13	.725
GRP(1)	21.59	1	21.59	1.04	.313
GRP(2)	109.80	1	109.80	5.27	.025
POSITION	6.20	2	3.10	.15	.862
GRP(1) BY POSITION	56.87	2	28.44	1.36	.264
GRP(2) BY POSITION	20.16	2	10.08	.48	.619

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	314.63	60	5.24		
SCENARIO	3.36	1	3.36	.64	.426
GRP(1) BY SCENARIO	7.61	1	7.61	1.45	.233
GRP(2) BY SCENARIO	15.34	1	15.34	2.93	.092
POSITION BY SCENARIO	2.89	2	1.44	.28	.760
GRP(1) BY POSITION BY SCENARIO	11.80	2	5.90	1.13	.331
GRP(2) BY POSITION BY SCENARIO	20.83	2	10.41	1.99	.146

Cell Means and Standard Deviations
Variable .. T9DFEF

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-1.368	3.544	4	-7.007	4.272
POSITION	Plt Ldrs	.662	4.326	13	-1.952	3.276
POSITION	Other TC	-.546	1.979	12	-1.804	.712
GRP	CVC2					
POSITION	Co Cadr	-2.733	4.096	3	-12.909	7.442
POSITION	Plt Ldrs	-2.045	3.351	13	-4.070	-.019
POSITION	Other TC	-1.565	3.314	8	-4.336	1.206
GRP	M1 Base					
POSITION	Co Cadr	4.060	.000	1		
POSITION	Plt Ldrs	1.053	2.946	9	-1.211	3.318
POSITION	Other TC	2.250	2.334	6	-.200	4.700
For entire sample		-.343	3.449	69	-1.172	.486

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Variable .. T9OFEF

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-.727	4.299	4	-7.568	6.113
POSITION	Plt Ldrs	.906	3.063	13	-.945	2.757
POSITION	Other TC	-.184	2.158	12	-1.555	1.187
GRP	CVC2					
POSITION	Co Cadr	-.447	2.660	3	-7.055	6.162
POSITION	Plt Ldrs	-2.160	5.139	13	-5.265	.945
POSITION	Other TC	1.304	5.637	8	-3.409	6.016
GRP	M1 Base					
POSITION	Co Cadr	3.370	.000	1		
POSITION	Plt Ldrs	.904	3.382	9	-1.695	3.504
POSITION	Other TC	.670	3.300	6	-2.793	4.133
For entire sample		.046	3.888	69	-.888	.980

Effort: Task 9 - Monitor/Correct Route Progress

Summaries of T9AVEF
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.1483	3.2954	69
GRP	1	IVC2	.0560	2.8576	29
GRP	2	CVC2	-1.3810	3.9339	24
GRP	3	M1 Base	1.3303	2.3269	16

Total Cases = 91
Missing Cases = 22 OR 24.2 PCT.

Summaries of T9AVEF
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.1483	3.2954	69
POSITION	1	Co Cadr	-.6556	3.3306	8
POSITION	2	Plt Ldrs	-.2379	3.7837	35
POSITION	3	Other TCs	.1283	2.6056	26

Total Cases = 91
Missing Cases = 22 OR 24.2 PCT.

Frustration: Task 9 - Monitor/Correct Route Progress

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	407.85	60	6.80		
SCENARIO	33.77	1	33.77	4.97	.030
GRP(1) BY SCENARIO	13.99	1	13.99	2.06	.157
GRP(2) BY SCENARIO	3.49	1	3.49	.51	.477
POSITION BY SCENARIO	11.49	2	5.74	.84	.435
GRP(1) BY POSITION BY SCENARIO	8.27	2	4.13	.61	.548
GRP(2) BY POSITION BY SCENARIO	39.09	2	19.54	2.88	.064

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	1360.90	60	22.68		
CONSTANT	4.67	1	4.67	.21	.651
GRP(1)	.70	1	.70	.03	.862
GRP(2)	47.91	1	47.91	2.11	.151
POSITION	112.83	2	56.42	2.49	.092
GRP(1) BY POSITION	34.51	2	17.25	.76	.472
GRP(2) BY POSITION	5.99	2	2.99	.13	.877

Cell Means and Standard Deviations
Variable .. T9DFFR

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-1.570	1.122	4	-3.355	.215
POSITION	Plt Ldrs	-.982	4.069	13	-3.441	1.477
POSITION	Other TC	.998	2.772	12	-.763	2.760
GRP	CVC2					
POSITION	Co Cadr	.513	3.395	3	-7.919	8.946
POSITION	Plt Ldrs	-3.475	2.908	13	-5.232	-1.717
POSITION	Other TC	-.591	5.693	8	-5.350	4.168
GRP	M1 Base					
POSITION	Co Cadr	-2.440	.000	1		
POSITION	Plt Ldrs	1.011	3.642	9	-1.788	3.810
POSITION	Other TC	2.688	3.244	6	-.716	6.093
For entire sample		-.473	3.902	69	-1.410	.464

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Variable .. T9DFFR

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-1.855	4.054	4	-8.306	4.596
POSITION	Plt Ldrs	-1.239	3.628	13	-3.431	.953
POSITION	Other TC	1.010	4.514	12	-1.858	3.878
GRP	CVC2					
POSITION	Co Cadr	.990	2.841	3	-6.066	8.046
POSITION	Plt Ldrs	-.465	3.825	13	-2.777	1.846
POSITION	Other TC	.536	4.742	8	-3.428	4.501
GRP	M1 Base					
POSITION	Co Cadr	5.560	.000	1		
POSITION	Plt Ldrs	.824	4.511	9	-2.643	4.292
POSITION	Other TC	3.045	2.383	6	.544	5.546
For entire sample		.305	4.044	69	-.666	1.276

Frustration: Task 9 - Monitor/Correct Route Progress

Summaries of T9AVFR
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.0840	3.4964	69
GRP	1	IVC2	-.3186	3.3324	29
GRP	2	CVC2	-.9823	3.6478	24
GRP	3	M1 Base	1.6887	3.0884	16

Total Cases = 91
Missing Cases = 22 OR 24.2 PCT.

Summaries of T9AVFR
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.0840	3.4964	69
POSITION	1	Co Cadr	-.3794	2.4823	8
POSITION	2	Plt Ldrs	-.9083	3.3182	35
POSITION	3	Other TCs	1.1165	3.7516	26

Total Cases = 91
Missing Cases = 22 OR 24.2 PCT.

Appendix G4
Plan and Communicate a Route

Variable or term	Description
GRP(1)	ANOVA factor comparing CVCC with M1 Baseline
GRP(2)	ANOVA factor comparing CVCC with IVCC
T7OFDVN and T7DFDVN	Not tested separately because of low n
T7DVN	Total workload deviation score--mean across scenarios

Deviation Scores: Task 7 - Plan & Comm a Route

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T7DVN using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	6865.24	45	152.56		
CONSTANT	1006.77	1	1006.77	6.60	.014
GRP(1)	101.17	1	101.17	.66	.420
GRP(2)	322.38	1	322.38	2.11	.153
POSITION	3.70	1	3.70	.02	.877
GRP(1) BY POSITION	2.46	1	2.46	.02	.899
GRP(2) BY POSITION	90.24	1	90.24	.59	.446

Cell Means and Standard Deviations
Variable .. T7DVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	4.019	13.165	4	-16.929	24.967
POSITION	Plt Ldrs	6.819	15.628	14	-2.204	15.842
GRP	CVC2					
POSITION	Co Cmdr	.751	5.464	5	-6.034	7.535
POSITION	Plt Ldrs	2.343	11.841	14	-4.494	9.179
GRP	M1 Base					
POSITION	Co Cmdr	12.200	10.689	3	-14.353	38.753
POSITION	Plt Ldrs	5.869	9.999	11	-.848	12.586
For entire sample		4.887	12.056	51	1.496	8.278

Appendix G5
Monitor/Correct Platoon Formation

Variable or term	Description
GRP(1)	ANOVA factor comparing CVCC with M1 Baseline
GRP(2)	ANOVA factor comparing CVCC with IVCC
T10DVN	Total workload deviation score--mean across scenarios

Deviation Scores: Task 10 - Monitor/Correct Platoon Formation

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T10DVN using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	9099.67	37	245.94		
CONSTANT	550.99	1	550.99	2.24	.143
GRP(1)	204.09	1	204.09	.83	.368
GRP(2)	308.96	1	308.96	1.26	.270
POSITION	152.70	1	152.70	.62	.436
GRP(1) BY POSITION	342.32	1	342.32	1.39	.246
GRP(2) BY POSITION	153.44	1	153.44	.62	.435

Cell Means and Standard Deviations
Variable .. T10DVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-7.824	9.983	2	-97.514	81.867
POSITION	Plt Ldrs	-5.175	14.148	14	-13.344	2.994
GRP	CVC2					
POSITION	Co Cmdr	7.770	10.883	4	-9.547	25.088
POSITION	Plt Ldrs	-7.180	18.872	12	-19.171	4.810
GRP	M1 Base					
POSITION	Co Cmdr	-6.790	12.254	2	-116.886	103.307
POSITION	Plt Ldrs	-9.702	15.711	9	-21.779	2.374
For entire sample		-5.676	15.439	43	-10.428	-.925

Deviation Scores: Task 10 - Monitor/Correct Platoon Formation

Summaries of T10DVN
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-4.2549	13.1566	73
GRP	1	IVC2	-4.3408	12.7835	29
GRP	2	CVC2	-3.3616	14.9305	24
GRP	3	M1 Base	-5.2022	11.9709	20

Total Cases = 73

Summaries of T10DVN
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-4.2549	13.1566	73
POSITION	1	Co Cadr	.2318	12.3105	8
POSITION	2	Plt Ldrs	-7.0266	15.9108	35
POSITION	3	Other TCs	-2.2176	8.7894	30

Total Cases = 73

Appendix G6
Monitor/Correct Platoon Positions within Company

Variable or term	Description
GRP(1)	ANOVA factor comparing CVCC with M1 Baseline
GRP(2)	ANOVA factor comparing CVCC with IVCC
T11DVN	Total workload deviation score--mean across scenarios (company commanders only)

Deviation Scores: Task 11 - Mon/Corrct Plt Position w/in Company

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T11DVN using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	797.40	8	99.68		
CONSTANT	900.01	1	900.01	9.03	.017
GRP(1)	1.33	1	1.33	.01	.911
GRP(2)	134.36	1	134.36	1.35	.279

Cell Means and Standard Deviations

Variable .. T11DVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC?	5.927	1.309	3	2.676	9.179
GRP	CVC2	6.768	13.696	5	-10.238	23.774
GRP	M1 Base	15.233	4.671	3	3.630	26.837
For entire sample		8.847	9.833	11	2.241	15.454

Appendix G7
Revise/Update Tactical Plan

Variable or term	Description
GRP(1)	ANOVA factor comparing CVCC with M1 Baseline
GRP(2)	ANOVA factor comparing CVCC with IVCC
T16DVN	Total workload deviation score--mean across scenarios
T16OFDVN and T16DFDVN	Not tested separately because of low n
T16AVMD	Mental Demand subscale deviation score--mean across scenarios
T16AVPD	Physical Demand subscale deviation score--mean across scenarios
T16AVTD	Time Demand subscale deviation score--mean across scenarios
T16AVEF	Effort subscale deviation score--mean across scenarios
T16AVFR	Frustration subscale deviation score--mean across scenarios

Deviation Scores: Task 16 - Revise/Update Tactical Plan

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T16DVN using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	3595.97	33	108.97		
CONSTANT	4621.44	1	4621.44	42.41	.000
GRP(1)	1427.81	1	1427.81	13.10	.001
GRP(2)	31.95	1	31.95	.29	.592
POSITION	292.53	1	292.53	2.68	.111
GRP(1) BY POSITION	352.87	1	352.87	3.24	.081
GRP(2) BY POSITION	.25	1	.25	.00	.962

Summaries of T16DVN
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			11.2144	12.0102	39
GRP	1		17.7500	14.1179	15
GRP	2		5.9056	9.2106	12
GRP	3		8.3537	7.8660	12

Total Cases = 39

Cell Means and Standard Deviations
Variable .. T16DVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	29.894	14.742	4	6.437	53.351
POSITION	Plt Ldrs	13.334	11.550	11	5.574	21.093
GRP	CVC2					
POSITION	Co Cadr	6.505	13.161	5	-9.836	22.845
POSITION	Plt Ldrs	5.478	6.289	7	-.339	11.294
GRP	MI Base					
POSITION	Co Cadr	8.789	4.425	3	-2.203	19.781
POSITION	Plt Ldrs	8.209	8.949	9	1.330	15.088
For entire sample		11.214	12.010	39	7.321	15.108

Deviation Scores: Task 16 - Revise/Update Tactical Plan

Summaries of T16DVN
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			11.2144	12.0102	39
POSITION	1		14.8721	15.8046	12
POSITION	2		9.5888	9.8094	27

Total Cases = 39

Mental Demand: Task 16 - Revise/Update Tactical Plan

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T16AVMD using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	330.62	33	10.02		
CONSTANT	232.47	1	232.47	23.20	.000
GRP(1)	61.74	1	61.74	6.16	.018
GRP(2)	6.09	1	6.09	.61	.441
POSITION	1.26	1	1.26	.13	.725
GRP(1) BY POSITION	13.32	1	13.32	1.33	.257
GRP(2) BY POSITION	11.09	1	11.09	1.11	.300

Mental Demand: Task 16 - Revise/Update Tactical Plan

Cell Means and Standard Deviations

Variable .. T16AVMD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	6.954	2.891	5	3.364	10.544
POSITION	Plt Ldrs	3.529	3.027	11	1.495	5.562
GRP	CVC2					
POSITION	Co Cadr	2.196	5.315	4	-6.261	10.654
POSITION	Plt Ldrs	1.789	2.010	7	-.069	3.648
GRP	M1 Base					
POSITION	Co Cadr	-.457	4.705	3	-12.144	11.231
POSITION	Plt Ldrs	2.183	2.556	9	.218	4.148
For entire sample		2.902	3.503	39	1.767	4.037

Mental Demand: Task 16 - Revise/Update Tactical Plan

Summaries of T16AVMD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			2.9019	3.5026	39
GRP	1	IVC2	4.5991	3.3208	16
GRP	2	CVC2	1.9373	3.3077	11
GRP	3	M1 Base	1.5233	3.1942	12

Total Cases = 39

Summaries of T16AVMD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			2.9019	3.5026	39
POSITION	1	Co Cadr	3.5154	5.0079	12
POSITION	2	Plt Ldrs	2.6293	2.6587	27

Total Cases = 39

Physical Deeand: Task 16 - Revise/Update Tactical Plan

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T16AVPD using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	227.11	33	6.88		
CONSTANT	81.33	1	81.33	11.82	.002
GRP(1)	9.34	1	9.34	1.36	.252
GRP(2)	1.51	1	1.51	.22	.643
POSITION	.08	1	.08	.01	.914
GRP(1) BY POSITION	3.05	1	3.05	.44	.510
GRP(2) BY POSITION	.10	1	.10	.01	.907

Task 16 - Revise/Update Tactical Plan

Cell Means and Standard Deviations
Variable .. T16AVPD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	2.729	2.539	5	-.423	5.881
POSITION	Plt Ldrs	1.774	3.029	11	-.261	3.809
GRP	CVC2					
POSITION	Co Cadr	.744	1.266	4	-1.271	2.759
POSITION	Plt Ldrs	1.232	2.234	7	-.834	3.298
GRP	M1 Base					
POSITION	Co Cadr	1.165	2.399	3	-4.795	7.125
POSITION	Plt Ldrs	1.936	2.813	9	-.227	4.098
For entire sample		1.684	2.508	39	.871	2.497

Physical Demand: Task 16 - Revise/Update Tactical Plan

Summaries of T16AVPD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			1.6838	2.5079	39
GRP	1	IVC2	2.0722	2.8364	16
GRP	2	CVC2	1.0545	1.8804	11
GRP	3	M1 Base	1.7429	2.6313	12

Total Cases = 39

Summaries of T16AVPD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			1.6838	2.5079	39
POSITION	1	Co Cadr	1.6762	2.1723	12
POSITION	2	Plt Ldrs	1.6872	2.6826	27

Total Cases = 39

Time Demand: Task 16 - Revise/Update Tactical Plan

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T16AVTD using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	242.60	33	7.35		
CONSTANT	139.83	1	139.83	19.02	.000
GRP(1)	71.56	1	71.56	9.73	.004
GRP(2)	1.46	1	1.46	.20	.659
POSITION	17.13	1	17.13	2.33	.136
GRP(1) BY POSITION	15.08	1	15.08	2.05	.161
GRP(2) BY POSITION	4.56	1	4.56	.62	.436

Task 16 - Revise/Update Tactical Plan

Cell Means and Standard Deviations

Variable .. T16AVTD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	6.738	2.527	5	3.601	9.875
POSITION	Plt Ldrs	2.480	2.487	11	.809	4.151
GRP	CVC2					
POSITION	Co Cmdr	1.635	4.230	4	-5.096	8.366
POSITION	Plt Ldrs	.589	2.055	7	-1.312	2.490
GRP	M1 Base					
POSITION	Co Cmdr	.105	5.032	3	-12.395	12.605
POSITION	Plt Ldrs	1.013	1.786	9	-.360	2.386
For entire sample		2.079	3.208	39	1.039	3.119

Time Demand: Task 16 - Revise/Update Tactical Plan

Summaries of T16AVTD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			2.0787	3.2083	39
GRP	1	IVC2	3.8109	3.1593	16
GRP	2	CVC2	.9691	2.8605	11
GRP	3	M1 Base	.7863	2.6631	12

Total Cases = 39

Summaries of T16AVTD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			2.0787	3.2083	39
POSITION	1	Co Cmdr	3.3788	4.5786	12
POSITION	2	Plt Ldrs	1.5009	2.2468	27

Total Cases = 39

Effort: Task 16 - Revise/Update Tactical Plan

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T16AVEF using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	293.47	33	8.89		
CONSTANT	148.38	1	148.38	16.68	.000
GRP(1)	40.15	1	40.15	4.52	.041
GRP(2)	.23	1	.23	.03	.874
POSITION	2.85	1	2.85	.32	.575
GRP(1) BY POSITION	3.64	1	3.64	.41	.527
GRP(2) BY POSITION	3.83	1	3.83	.43	.516

Task 16 - Revise/Update Tactical Plan

Cell Means and Standard Deviations

Variable .. T16AVEF

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	5.099	3.685	5	.524	9.674
POSITION	Plt Ldrs	2.852	2.802	11	.970	4.735
GRP	CVC2					
POSITION	Co Cadr	1.690	3.893	4	-4.504	7.884
POSITION	Plt Ldrs	1.021	3.015	7	-1.767	3.810
GRP	M1 Base					
POSITION	Co Cadr	.577	2.907	3	-6.645	7.799
POSITION	Plt Ldrs	1.699	2.338	9	-.099	3.496
For entire sample		2.251	3.082	39	1.252	3.250

Summaries of T16AVEF
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			2.2513	3.0822	39
POSITION	1	Co Cadr	2.8321	3.8475	12
POSITION	2	Plt Ldrs	1.9931	2.7197	27

Total Cases = 39

Effort: Task 16 - Revise/Update Tactical Plan

Summaries of T16AVEF
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			2.2513	3.0822	39
GRP	1	IVC2	3.5544	3.1639	16
GRP	2	CVC2	1.2645	3.1804	11
GRP	3	M1 Base	1.4183	2.4024	12

Total Cases = 39

Frustration: Task 16 - Revise/Update Tactical Plan

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T16AVFR using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	236.74	33	7.17	-	
CONSTANT	104.27	1	104.27	14.53	.001
GRP(1)	64.50	1	64.50	8.99	.005
GRP(2)	.41	1	.41	.06	.813
POSITION	1.03	1	1.03	.14	.707
GRP(1) BY POSITION	13.14	1	13.14	1.83	.185
GRP(2) BY POSITION	.28	1	.28	.04	.846

Task 16 - Revise/Update Tactical Plan

Cell Means and Standard Deviations

Variable .. T16AVFR

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	5.183	3.572	5	.747	9.619
POSITION	Plt Ldrs	2.665	2.759	11	.812	4.519
GRP	CVC2					
POSITION	Co Cadr	.364	.880	4	-1.036	1.763
POSITION	Plt Ldrs	.844	1.657	7	-.688	2.376
GRP	M1 Base					
POSITION	Co Cadr	.415	6.099	3	-14.737	15.567
POSITION	Plt Ldrs	1.376	1.431	9	.275	2.476
For entire sample		1.954	2.917	39	1.009	2.900

Frustration: Task 16 - Revise/Update Tactical Plan

Summaries of T16AVFR
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			1.9544	2.9169	39
GRP	1	IVC2	3.4522	3.1512	16
GRP	2	CVC2	.6691	1.3918	11
GRP	3	M1 Base	1.1354	2.9056	12

Total Cases = 39

Summaries of T16AVFR
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			1.9544	2.9169	39
POSITION	1	Co Cadr	2.3846	4.2093	12
POSITION	2	Plt Ldrs	1.7631	2.1944	27

Total Cases = 39

Appendix G8
Determine OPFOR Strength and Disposition

Variable or term	Description
GRP(1)	ANOVA factor comparing CVCC with M1 Baseline
GRP(2)	ANOVA factor comparing CVCC with IVCC
T17DFDVN	Total workload deviation score for defensive scenario
T17OFDVN	Total workload deviation score for offensive scenario
TSK17DVN	Total workload deviation score-mean across scenarios

Deviation Scores: Task 17 - Dtra OPFOR Strength & Dispos'tn

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	16119.46	41	393.16		
CONSTANT	1487.22	1	1487.22	3.78	.059
GRP(1)	1.10	1	1.10	.00	.958
GRP(2)	339.80	1	339.80	.86	.358
POSITION	810.09	2	405.05	1.03	.366
GRP(1) BY POSITION	679.36	2	339.68	.86	.429
GRP(2) BY POSITION	848.48	2	424.24	1.08	.349

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	4746.29	41	115.76		
SCENARIO	142.62	1	142.62	1.23	.273
GRP(1) BY SCENARIO	2.50	1	2.50	.02	.884
GRP(2) BY SCENARIO	58.68	1	58.68	.51	.481
POSITION BY SCENARIO	624.59	2	312.29	2.70	.079
GRP(1) BY POSITION B Y SCENARIO	14.07	2	7.03	.06	.941
GRP(2) BY POSITION B Y SCENARIO	723.99	2	361.99	3.13	.054

Cell Means and Standard Deviations
Variable .. T17DFDVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	24.235	13.052	3	-8.188	56.658
POSITION	Plt Ldrs	4.467	11.512	11	-3.266	12.201
POSITION	Other TC	-3.357	11.133	5	-17.181	10.466
GRP	CVC2					
POSITION	Co Cadr	14.394	23.016	4	-22.229	51.017
POSITION	Plt Ldrs	6.771	13.951	8	-4.892	18.435
POSITION	Other TC	2.143	7.068	5	-6.633	10.919
GRP	M1 Base					
POSITION	Co Cadr	-12.985	28.126	3	-82.855	56.886
POSITION	Plt Ldrs	13.957	23.033	8	-5.300	33.213
POSITION	Other TC	.766	2.914	3	-6.473	8.005
For entire sample		6.050	16.974	50	1.226	10.874

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Variable .. T17DFDVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	19.286	15.560	3	-19.367	57.938
POSITION	Plt Ldrs	-2.500	15.973	11	-13.230	8.231
POSITION	Other TC	-5.237	5.345	5	-11.874	1.399
GRP	CVC2					
POSITION	Co Cadr	7.504	31.820	4	-43.129	58.136
POSITION	Plt Ldrs	2.605	12.203	8	-7.597	12.807
POSITION	Other TC	1.851	4.071	5	-3.204	6.905
GRP	M1 Base					
POSITION	Co Cadr	.784	27.825	3	-68.338	69.907
POSITION	Plt Ldrs	-3.211	14.081	8	-14.984	8.561
POSITION	Other TC	5.481	1.874	3	.824	10.137
For entire sample		1.148	15.627	50	-3.294	5.589

Deviation Scores: Task 17 - Dtrm OPFOR Strength & Dispos'tn

Summaries of TSK17DVN
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			3.5991	14.2734	50
GRP	1	IVC2	2.8746	13.7532	19
GRP	2	CVC2	5.3697	13.1461	17
GRP	3	M1 Base	2.4322	16.9401	14

Total Cases = 91
Missing Cases = 41 OR 45.1 PCT.

Summaries of TSK17DVN
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			3.5991	14.2734	50
GRP	1	IVC2	2.8746	13.7532	19
POSITION	1	Co Cmdr	21.7605	13.8045	3
POSITION	2	Plt Ldrs	.9838	12.1956	11
POSITION	3	Other TCs	-4.2974	6.5138	5
GRP	2	CVC2	5.3697	13.1461	17
POSITION	1	Co Cmdr	10.9489	25.5458	4
POSITION	2	Plt Ldrs	4.6881	8.8656	8
POSITION	3	Other TCs	1.9969	4.2443	5
GRP	3	M1 Base	2.4322	16.9401	14
POSITION	1	Co Cmdr	-6.1000	27.9556	3
POSITION	2	Plt Ldrs	5.3727	16.3474	8
POSITION	3	Other TCs	3.1233	1.9800	3

Total Cases = 91
Missing Cases = 41 OR 45.1 PCT.

Appendix H

Target Acquisition and Firing Task Analysis of Variance Summaries, Descriptive Statistics, and Task Multiple Regressions

Appendix H1
Coordinate Sector Searches

Variable or term	Description
GRP(1)	ANOVA factor comparing CVCC with M1 Baseline
GRP(2)	ANOVA factor comparing CVCC with IVCC
T14DVN	Total workload deviation score--mean across scenarios
T14OFDVN and T14DFDVN	Not tested separately because of low n
T14AVMD	Mental Demand subscale deviation score--mean across scenarios
T14AVPD	Physical Demand subscale deviation score--mean across scenarios
T14AVTD	Time Demand subscale deviation score--mean across scenarios
T14AVEF	Effort subscale deviation score--mean across scenarios
T14AVFR	Frustration subscale deviation score--mean across scenarios

Deviation Scores: Task 14 - Coordinate Sector Searches

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T14DVN using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	3864.48	61	63.35		
CONSTANT	1090.43	1	1090.43	17.21	.000
GRP(1)	2.91	1	2.91	.05	.831
GRP(2)	233.86	1	233.86	3.69	.059
POSITION	618.28	2	309.14	4.88	.011
GRP(1) BY POSITION	159.90	2	79.95	1.26	.290
GRP(2) BY POSITION	294.45	2	147.22	2.32	.106

"Deviation Scores: Task 14 - Coordinate Sector Searches".

Cell Means and Standard Deviations

Variable .. T14DVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-9.824	6.126	4	-19.572	-.077
POSITION	Plt Ldrs	-3.317	9.105	13	-8.819	2.184
POSITION	Other TC	-5.670	4.645	10	-8.993	-2.347
GRP	CVC2					
POSITION	Co Cadr	-17.743	18.832	2	-186.938	151.452
POSITION	Plt Ldrs	.878	8.083	11	-4.552	6.308
POSITION	Other TC	-3.760	4.472	9	-7.198	-.322
GRP	M1 Base					
POSITION	Co Cadr	-.933	12.580	3	-32.185	30.318
POSITION	Plt Ldrs	1.094	10.639	10	-6.516	8.705
POSITION	Other TC	-3.618	2.923	8	-6.062	-1.174
For entire sample		-3.137	8.436	70	-5.149	-1.125

Deviation Scores: Task 14 - Coordinate Sector Searches

Summaries of T14DVN
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-3.1370	8.4364	70
GRP	1	IVC2	-5.1526	7.4298	27
GRP	2	CVC2	-2.7122	9.1845	22
GRP	3	M1 Base	-.9905	8.6422	21

Total Cases = 70

Summaries of T14DVN
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-3.1370	8.4364	70
POSITION	1	Co Cadr	-8.6204	11.9020	9
POSITION	2	Plt Ldrs	-.6625	9.2365	34
POSITION	3	Other TCs	-4.4252	4.1076	27

Total Cases = 70

Mental Demand: Task 14 - Coordinate Sector Searches

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T14AVMD using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	311.43	62	5.02		
CONSTANT	3.75	1	3.75	.75	.391
GRP(1)	.13	1	.13	.03	.873
GRP(2)	1.33	1	1.33	.27	.608
POSITION	.69	2	.34	.07	.934
GRP(1) BY POSITION	.27	2	.13	.03	.974
GRP(2) BY POSITION	13.94	2	6.97	1.39	.257

Mental Demand: Task 14 - Coordinate Sector Searches

Summaries of T14AVMD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.2508	2.1787	71
GRP	1	IVC2	-.3111	2.4838	27
GRP	2	CVC2	-.1404	2.1478	23
GRP	3	M1 Base	-.2943	1.8706	21

Total Cases = 71

Mental Demand: Task 14 - Coordinate Sector Searches

Summaries of T14AVMD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.2508	2.1787	71
POSITION	1	Co Cadr	-.3665	3.2996	10
POSITION	2	Plt Ldrs	-.1594	2.1706	34
POSITION	3	Other TCs	-.3231	1.7350	27

Total Cases = 71

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-1.137	2.045	4	-4.391	2.116
POSITION	Plt Ldrs	-.299	2.948	13	-2.081	1.483
POSITION	Other TC	.004	2.103	10	-1.501	1.508
GRP	CVC2					
POSITION	Co Cadr	-1.082	4.496	3	-12.249	10.086
POSITION	Plt Ldrs	.004	1.948	11	-1.305	1.312
POSITION	Other TC	-.003	1.584	9	-1.221	1.215
GRP	M1 Base					
POSITION	Co Cadr	1.377	4.000	3	-8.559	11.312
POSITION	Plt Ldrs	-.157	1.187	10	-1.007	.692
POSITION	Other TC	-1.092	1.290	8	-2.171	-.013
For entire sample		-.251	2.179	71	-.767	.265

Task 14 - Coordinate Sector Searches

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T14AVPD using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	169.76	62	2.74		
CONSTANT	8.34	1	8.34	3.05	.086
GRP(1)	1.06	1	1.06	.39	.536
GRP(2)	.07	1	.07	.03	.874
POSITION	17.77	2	8.88	3.24	.046
GRP(1) BY POSITION	16.36	2	8.18	2.99	.058
GRP(2) BY POSITION	7.84	2	3.92	1.43	.247

Task 14 - Coordinate Sector Searches

Cell Means and Standard Deviations

Variable .. T14AVPD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-.449	2.256	4	-4.039	3.142
POSITION	Plt Ldrs	-.465	1.408	13	-1.315	.386
POSITION	Other TC	-1.038	1.164	10	-1.871	-.205
GRP	CVC2					
POSITION	Co Cmdr	-2.272	2.886	3	-9.442	4.898
POSITION	Plt Ldrs	1.190	1.849	11	-.052	2.432
POSITION	Other TC	.139	.688	9	-.390	.668
GRP	M1 Base					
POSITION	Co Cmdr	-.668	2.079	3	-5.834	4.497
POSITION	Plt Ldrs	.203	2.386	10	-1.504	1.909
POSITION	Other TC	-.202	.756	8	-.834	.430
For entire sample		-.173	1.754	71	-.588	.242

Task 14 - Coordinate Sector Searches

Summaries of T14AVPD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.1730	1.7539	71
GRP	1	IVC2	-.6746	1.4324	27
GRP	2	CVC2	.3274	1.9469	23
GRP	3	M1 Base	-.0760	1.8144	21

Total Cases = 71

Task 14 - Coordinate Sector Searches

Summaries of T14AVPD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.1730	1.7539	71
POSITION	1	Co Cadr	-1.0615	2.2838	10
POSITION	2	Plt Ldrs	.2669	1.9506	34
POSITION	3	Other TCs	-.3978	1.0189	27

Total Cases = 71

Time Demand: Task 14 - Coordinate Sector Searches

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T14AVTD using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	347.05	62	5.60		
CONSTANT	84.07	1	84.07	15.02	.000
GRP(1)	.10	1	.10	.02	.894
GRP(2)	21.43	1	21.43	3.83	.055
POSITION	36.76	2	18.38	3.28	.044
GRP(1) BY POSITION	3.72	2	1.86	.33	.718
GRP(2) BY POSITION	28.65	2	14.33	2.56	.085

Task 14 - Coordinate Sector Searches

Cell Means and Standard Deviations

Variable .. T14AVTD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-3.230	2.155	4	-6.659	.199
POSITION	Plt Ldrs	-.759	2.994	13	-2.568	1.050
POSITION	Other TC	-1.600	1.590	10	-2.737	-.463
GRP	CVC2					
POSITION	Co Cadr	-3.755	3.382	3	-12.155	4.645
POSITION	Plt Ldrs	.121	2.271	11	-1.404	1.647
POSITION	Other TC	-1.646	2.545	9	-3.602	.311
GRP	M1 Base					
POSITION	Co Cadr	.938	2.726	3	-5.834	7.710
POSITION	Plt Ldrs	-.074	2.383	10	-1.779	1.631
POSITION	Other TC	-1.302	1.229	8	-2.330	-.275
For entire sample		-1.012	2.485	71	-1.600	-.424

Time Demand: Task 14 - Coordinate Sector Searches

Summaries of T14AVTD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-1.0123	2.4849	71
GRP	1	IVC2	-1.4365	2.5064	27
GRP	2	CVC2	-1.0757	2.7510	23
GRP	3	M1 Base	-.3974	2.1155	21

Total Cases = 71

Time Demand: Task 14 - Coordinate Sector Searches

Summaries of T14AVTD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-1.0123	2.4849	71
POSITION	1	Co Cadr	-2.1370	3.2088	10
POSITION	2	Plt Ldrs	-.2726	2.5549	34
POSITION	3	Other TCs	-1.5270	1.8159	27

Total Cases = 71

Task 14 - Coordinate Sector Searches

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T14AVEF using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	325.79	62	5.25		
CONSTANT	34.09	1	34.09	6.49	.013
GRP(1)	1.50	1	1.50	.28	.595
GRP(2)	6.91	1	6.91	1.31	.256
POSITION	45.43	2	22.71	4.32	.017
GRP(1) BY POSITION	11.23	2	5.61	1.07	.350
GRP(2) BY POSITION	10.97	2	5.49	1.04	.358

Task 14 - Coordinate Sector Searches

Cell Means and Standard Deviations

Variable .. T14AVEF

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-2.187	1.875	4	-5.172	.797
POSITION	Plt Ldrs	-.750	2.306	13	-2.144	.644
POSITION	Other TC	-1.179	1.247	10	-2.071	-.287
GRP	CVC2					
POSITION	Co Cadr	-3.245	2.913	3	-10.481	3.991
POSITION	Plt Ldrs	.973	2.921	11	-.990	2.935
POSITION	Other TC	-.644	1.540	9	-1.827	.540
GRP	MI Base					
POSITION	Co Cadr	-.423	4.143	3	-10.716	9.869
POSITION	Plt Ldrs	.770	2.918	10	-1.318	2.857
POSITION	Other TC	-.514	.860	8	-1.233	.205
For entire sample		-.462	2.406	71	-1.032	.107

Task 14 - Coordinate Sector Searches

Summaries of T14AVEF
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.4620	2.4062	71
GRP	1	IVC2	-1.1219	1.9088	27
GRP	2	CVC2	-.2100	2.7467	23
GRP	3	M1 Base	.1102	2.4948	21

Total Cases = 71

Task 14 - Coordinate Sector Searches

Summaries of T14AVEF
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.4620	2.4062	71
POSITION	1	Co Cadr	-1.9755	2.8693	10
POSITION	2	Plt Ldrs	.2543	2.7371	34
POSITION	3	Other TCs	-.8035	1.2473	27

Total Cases = 71

Task 14 - Coordinate Sector Searches

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T14AVFR using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	344.85	62	5.56		
CONSTANT	116.77	1	116.77	20.99	.000
GRP(1)	.00	1	.00	.00	.989
GRP(2)	14.89	1	14.89	2.68	.107
POSITION	22.05	2	11.02	1.98	.146
GRP(1) BY POSITION	.83	2	.41	.07	.928
GRP(2) BY POSITION	.97	2	.48	.09	.917

Task 14 - Coordinate Sector Searches

Cell Means and Standard Deviations

Variable .. T14AVFR

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	-2.832	1.693	4	-5.526	-.139
POSITION	Plt Ldrs	-1.074	2.095	13	-2.340	.192
POSITION	Other TC	-1.902	1.827	10	-3.209	-.595
GRP	CVC2					
POSITION	Co Cmdr	-2.653	4.216	3	-13.127	7.820
POSITION	Plt Ldrs	-1.407	1.937	11	-2.708	-.106
POSITION	Other TC	-1.716	1.127	9	-2.582	-.849
GRP	M1 Base					
POSITION	Co Cmdr	-1.585	4.752	3	-13.391	10.221
POSITION	Plt Ldrs	.353	3.469	10	-2.129	2.834
POSITION	Other TC	-.508	1.549	8	-1.803	.787
For entire sample		-1.246	2.385	71	-1.811	-.682

Task 14 - Coordinate Sector Searches

Summaries of T14AVFR
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-1.2463	2.3847	71
GRP	1	IVC2	-1.6413	1.9793	27
GRP	2	CVC2	-1.6902	1.9875	23
GRP	3	M1 Base	-.2521	2.9984	21

Total Cases = 71

Task 14 - Coordinate Sector Searches

Summaries of T14AVFR
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-1.2463	2.3847	71
POSITION	1	Co Cadr	-2.4045	3.2016	10
POSITION	2	Plt Ldrs	-.7622	2.5631	34
POSITION	3	Other TCs	-1.4269	1.6024	27

Total Cases = 71

Appendix H2
Identify and Prioritize Targets

Variable or term	Description
GRP(1)	ANOVA factor comparing CVCC with M1 Baseline
GRP(2)	ANOVA factor comparing CVCC with IVCC
T12DFDVN	Total workload deviation score for defensive scenario
T12OFDVN	Total workload deviation score for offensive scenario
TSK12DVN	Total workload deviation score-mean across scenarios
T12DFMD	Mental Demand subscale deviation score for defensive scenario
T12OFMD	Mental Demand subscale deviation score for offensive scenario
T12AVMD	Mental Demand subscale deviation score--mean across scenarios
T12DFPD	Physical Demand subscale deviation score for defensive scenario
T12OFPD	Physical Demand subscale deviation score for offensive scenario
T12AVPD	Physical Demand subscale deviation score--mean across scenarios
T12DFTD	Time Demand subscale deviation score for defensive scenario
T12OFTD	Time Demand subscale deviation score for offensive scenario
T12AVTD	Time Demand subscale deviation score--mean across scenarios
T12DFEF	Effort subscale deviation score for defensive scenario
T12OFEF	Effort subscale deviation score for offensive scenario
T12AVEF	Effort subscale deviation score--mean across scenarios
T12DFFR	Frustration subscale deviation score for defensive scenario
T12OFFR	Frustration subscale deviation score for offensive scenario
T12AVFR	Frustration subscale deviation score--mean across scenarios

Deviation Scores: Task 12 - Identify & Prioritize Targets

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	13532.47	62	218.27		
CONSTANT	69.11	1	69.11	.32	.576
GRP(1)	231.97	1	231.97	1.06	.307
GRP(2)	2.97	1	2.97	.01	.908
POSITION	376.55	2	188.28	.86	.427
GRP(1) BY POSITION	2650.05	2	1325.03	6.07	.004
GRP(2) BY POSITION	557.55	2	278.77	1.28	.286

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	4710.30	62	75.97		
SCENARIO	21.34	1	21.34	.28	.598
GRP(1) BY SCENARIO	67.85	1	67.85	.89	.348
GRP(2) BY SCENARIO	111.61	1	111.61	1.47	.230
POSITION BY SCENARIO	369.40	2	184.70	2.43	.096
GRP(1) BY POSITION BY SCENARIO	37.44	2	18.72	.25	.782
GRP(2) BY POSITION BY SCENARIO	66.45	2	33.22	.44	.648

title 'Global Tasks - 5 Scale Workload - Outliers Removed'.
subtitle 'Deviation Scores: Task 12 - Identify & Prioritize Targets'.

Cell Means and Standard Deviations
Variable .. T12DFDVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	6.235	7.600	3	-12.645	25.115
POSITION	Plt Ldrs	-2.616	13.855	12	-11.420	6.187
POSITION	Other TC	4.213	11.838	12	-3.308	11.735
GRP	CVC2					
POSITION	Co Cmdr	-22.798	22.813	2	-227.761	182.165
POSITION	Plt Ldrs	8.096	15.101	13	-1.030	17.221
POSITION	Other TC	4.447	10.042	9	-3.272	12.166
GRP	M1 Base					
POSITION	Co Cmdr	-4.313	.000	1		
POSITION	Plt Ldrs	6.190	9.696	11	-.323	12.704
POSITION	Other TC	-3.505	6.265	8	-8.743	1.733
For entire sample		2.441	12.897	71	-.612	5.493

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Variable .. T12DFDVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	9.619	13.017	3	-22.717	41.955
POSITION	Plt Ldrs	-8.757	10.254	12	-15.272	-2.241
POSITION	Other TC	2.001	9.607	12	-4.103	8.105
GRP	CVC2					
POSITION	Co Cmdr	-11.276	34.066	2	-317.344	294.793
POSITION	Plt Ldrs	2.463	12.640	13	-5.176	10.101
POSITION	Other TC	6.286	13.742	9	-4.277	16.849
GRP	M1 Base					
POSITION	Co Cmdr	-8.938	.000	1		
POSITION	Plt Ldrs	-.725	12.683	11	-9.246	7.795
POSITION	Other TC	-4.852	8.344	8	-11.828	2.124
For entire sample		-.590	12.750	71	-3.608	2.428

Deviation Scores: Task 12 - Identify & Prioritize Targets

Summaries of TSK12DVN
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.9252	11.2539	71
GRP	1	IVC2	-.2656	10.3181	27
GRP	2	CVC2	3.4523	14.2132	24
GRP	3	M1 Base	-.4998	8.0099	20

Total Cases = 91
Missing Cases = 20 OR 22.0 PCT.

Summaries of TSK12DVN
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.9252	11.2539	71
GRP	1	IVC2	-.2656	10.3181	27
POSITION	1	Co Cmdr	7.9272	3.7353	3
POSITION	2	Plt Ldrs	-5.6866	9.7354	12
POSITION	3	Other TCs	3.1071	9.5684	12
GRP	2	CVC2	3.4523	14.2132	24
POSITION	1	Co Cmdr	-17.0366	28.4392	2
POSITION	2	Plt Ldrs	5.2791	13.2295	13
POSITION	3	Other TCs	5.3666	10.1328	9
GRP	3	M1 Base	-.4998	8.0099	20
POSITION	1	Co Cmdr	-6.6250	.0000	1
POSITION	2	Plt Ldrs	2.7325	8.0156	11
POSITION	3	Other TCs	-4.1786	6.7167	8

Total Cases = 91
Missing Cases = 20 OR 22.0 PCT.

Mental Demand: Task 12 - Identify/Prioritize Targets

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	1078.69	62	17.40		
CONSTANT	.05	1	.05	.00	.958
GRP(1)	5.17	1	5.17	.30	.587
GRP(2)	.25	1	.25	.01	.905
POSITION	26.57	2	13.28	.76	.470
GRP(1) BY POSITION	210.01	2	105.00	6.04	.004
GRP(2) BY POSITION	46.12	2	23.06	1.33	.273

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	517.62	62	8.35		
SCENARIO	.01	1	.01	.00	.979
GRP(1) BY SCENARIO	.27	1	.27	.03	.859
GRP(2) BY SCENARIO	.19	1	.19	.02	.881
POSITION BY SCENARIO	27.31	2	13.66	1.64	.203
GRP(1) BY POSITION BY SCENARIO	2.50	2	1.25	.15	.861
GRP(2) BY POSITION BY SCENARIO	.17	2	.08	.01	.990

Mental Demand: Task 12 - Identify/Prioritize Targets

Cell Means and Standard Deviations
Variable .. T12DFMD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	1.173	.919	3	-1.109	3.456
POSITION	Plt Ldrs	-1.305	5.159	12	-4.583	1.973
POSITION	Other TC	1.435	3.442	12	-.752	3.622
GRP	CVC2					
POSITION	Co Cadr	-5.030	6.520	2	-63.606	53.546
POSITION	Plt Ldrs	2.676	2.977	13	.877	4.475
POSITION	Other TC	1.506	3.145	9	-.912	3.923
GRP	M1 Base					
POSITION	Co Cadr	-1.190	.000	1		
POSITION	Plt Ldrs	.840	1.918	11	-.448	2.128
POSITION	Other TC	-.431	1.486	8	-1.673	.811
For entire sample		.675	3.579	71	-.172	1.523

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Variable .. T12OFMD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	1.563	5.090	3	-11.080	14.207
POSITION	Plt Ldrs	-2.540	4.963	12	-5.693	.613
POSITION	Other TC	1.523	3.406	12	-.641	3.687
GRP	CVC2					
POSITION	Co Cadr	-2.965	9.850	2	-91.464	85.534
POSITION	Plt Ldrs	1.135	3.433	13	-.940	3.209
POSITION	Other TC	1.022	2.483	9	-.886	2.930
GRP	M1 Base					
POSITION	Co Cadr	1.620	.000	1		
POSITION	Plt Ldrs	-.703	3.598	11	-3.120	1.714
POSITION	Other TC	-.813	1.844	8	-2.354	.729
For entire sample		-.030	3.893	71	-.951	.892

Mental Demand: Task 12 - Identify/Prioritize Targets

Summaries of T12AVMD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3230	3.1733	71
GRP	1	IVC2	-.0450	3.7525	27
GRP	2	CVC2	1.1729	3.3804	24
GRP	3	M1 Base	-.2002	1.6140	20

Total Cases = 91
Missing Cases = 20 OR 22.0 PCT.

Summaries of T12AVMD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3230	3.1733	71
POSITION	1	Co Cadr	-.6125	4.7268	6
POSITION	2	Plt Ldrs	.0682	3.3664	36
POSITION	3	Other TCs	.8328	2.5454	29

Total Cases = 91
Missing Cases = 20 OR 22.0 PCT.

Summaries of T12AVMD
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3230	3.1733	71
GRP	1	IVC2	-.0450	3.7525	27
POSITION	1	Co Cadr	1.3683	2.1625	3
POSITION	2	Plt Ldrs	-1.9225	4.0569	12
POSITION	3	Other TCs	1.4792	3.0082	12
GRP	2	CVC2	1.1729	3.3804	24
POSITION	1	Co Cadr	-3.9975	8.1848	2
POSITION	2	Plt Ldrs	1.9054	2.8092	13
POSITION	3	Other TCs	1.2639	2.2531	9
GRP	3	M1 Base	-.2002	1.6140	20
POSITION	1	Co Cadr	.2150	.0000	1
POSITION	2	Plt Ldrs	.0686	1.7164	11
POSITION	3	Other TCs	-.6219	1.5877	8

Total Cases = 91
Missing Cases = 20 OR 22.0 PCT.

Physical Demand: Task 12 - Identify/Prioritize Targets

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	495.10	62	7.99		
CONSTANT	19.67	1	19.67	2.46	.122
GRP(1)	5.11	1	5.11	.64	.427
GRP(2)	.91	1	.91	.11	.737
POSITION	6.36	2	3.18	.40	.673
GRP(1) BY POSITION	48.78	2	24.39	3.05	.054
GRP(2) BY POSITION	2.25	2	1.12	.14	.869

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	283.47	62	4.57		
SCENARIO	5.64	1	5.64	1.23	.271
GRP(1) BY SCENARIO	5.84	1	5.84	1.28	.263
GRP(2) BY SCENARIO	11.42	1	11.42	2.50	.119
POSITION BY SCENARIO	3.64	2	1.82	.40	.673
GRP(1) BY POSITION BY SCENARIO	7.44	2	3.72	.81	.448
GRP(2) BY POSITION BY SCENARIO	2.66	2	1.33	.29	.749

"Physical Demand: Task 12 - Identify/Prioritize Targets".

Cell Means and Standard Deviations
Variable .. T12DFPD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	1.493	5.058	3	-11.071	14.058
POSITION	Plt Ldrs	-.629	3.485	12	-2.844	1.585
POSITION	Other TC	1.504	3.379	12	-.643	3.651
GRP	CVC2					
POSITION	Co Cadr	-1.410	2.348	2	-22.502	19.682
POSITION	Plt Ldrs	.687	2.222	13	-.656	2.030
POSITION	Other TC	-.514	1.229	9	-1.459	.430
GRP	M1 Base					
POSITION	Co Cadr	.940	.000	1		
POSITION	Plt Ldrs	.845	2.323	11	-.716	2.405
POSITION	Other TC	-.656	.553	8	-1.119	-.194
For entire sample		.302	2.673	71	-.331	.935

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Variable .. T12OFPD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	3.847	1.768	3	-.545	8.238
POSITION	Plt Ldrs	-.397	2.617	12	-2.060	1.265
POSITION	Other TC	.368	2.129	12	-.984	1.721
GRP	CVC2					
POSITION	Co Cadr	1.570	3.168	2	-26.892	30.032
POSITION	Plt Ldrs	1.348	2.511	13	-.170	2.865
POSITION	Other TC	1.020	2.081	9	-.579	2.619
GRP	M1 Base					
POSITION	Co Cadr	-.130	.000	1		
POSITION	Plt Ldrs	.428	2.732	11	-1.407	2.263
POSITION	Other TC	-.589	1.122	8	-1.527	.350
For entire sample		.576	2.397	71	.009	1.143

Physical Demand: Task 12 - Identify/Prioritize Targets

Summaries of T12AVPD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4390	2.0378	71
GRP	1	IVC2	.4846	2.6313	27
GRP	2	CVC2	.6525	1.7301	24
GRP	3	M1 Base	.1213	1.4267	20

Total Cases = 91
Missing Cases = 20 OR 22.0 PCT.

Summaries of T12AVPD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4390	2.0378	71
POSITION	1	Co Cadr	1.4292	2.6426	6
POSITION	2	Plt Ldrs	.3907	2.2162	36
POSITION	3	Other TCs	.2941	1.6616	29

Total Cases = 91
Missing Cases = 20 OR 22.0 PCT.

Summaries of T12AVPD
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4390	2.0378	71
GRP	1	IVC2	.4846	2.6313	27
POSITION	1	Co Cadr	2.6700	3.0002	3
POSITION	2	Plt Ldrs	-.5133	2.5957	12
POSITION	3	Other TCs	.9363	2.3192	12
GRP	2	CVC2	.6525	1.7301	24
POSITION	1	Co Cadr	.0800	2.7577	2
POSITION	2	Plt Ldrs	1.0173	2.1246	13
POSITION	3	Other TCs	.2528	.6360	9
GRP	3	M1 Base	.1212	1.4267	20
POSITION	1	Co Cadr	.4050	.0000	1
POSITION	2	Plt Ldrs	.6364	1.6743	11
POSITION	3	Other TCs	-.6225	.6777	8

Total Cases = 91
Missing Cases = 20 OR 22.0 PCT.

Time Demand: Task 12 - Identify/Prioritize Targets

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	1135.27	62	18.31		
CONSTANT	9.60	1	9.60	.52	.472
GRP(1)	10.13	1	10.13	.55	.460
GRP(2)	.14	1	.14	.01	.931
POSITION	15.38	2	7.69	.42	.659
GRP(1) BY POSITION	117.36	2	58.68	3.20	.047
GRP(2) BY POSITION	52.36	2	26.18	1.43	.247

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	421.33	62	6.80		
SCENARIO	.43	1	.43	.06	.802
GRP(1) BY SCENARIO	.86	1	.86	.13	.724
GRP(2) BY SCENARIO	1.04	1	1.04	.15	.697
POSITION BY SCENARIO	60.95	2	30.48	4.48	.015
GRP(1) BY POSITION BY SCENARIO	1.36	2	.68	.10	.905
GRP(2) BY POSITION BY SCENARIO	2.76	2	1.38	.20	.817

Cell Means and Standard Deviations
Variable .. T12DFTD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	2.083	1.507	3	-1.660	5.827
POSITION	Plt Ldrs	-.362	3.979	12	-2.890	2.167
POSITION	Other TC	-.956	3.069	12	-2.906	.994
GRP	CVC2					
POSITION	Co Cadr	-4.370	5.940	2	-57.736	48.996
POSITION	Plt Ldrs	.926	4.228	13	-1.629	3.481
POSITION	Other TC	1.043	4.339	9	-2.292	4.379
GRP	M1 Base					
POSITION	Co Cadr	-2.690	.000	1		
POSITION	Plt Ldrs	2.172	3.004	11	.154	4.190
POSITION	Other TC	-.525	2.614	8	-2.710	1.660
For entire sample		.284	3.705	71	-.594	1.161

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Variable .. T12DFTD

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	1.553	3.710	3	-7.663	10.770
POSITION	Plt Ldrs	-1.859	3.050	12	-3.797	.079
POSITION	Other TC	.304	2.788	12	-1.467	2.075
GRP	CVC2					
POSITION	Co Cadr	-3.380	8.132	2	-76.441	69.681
POSITION	Plt Ldrs	-.529	3.000	13	-2.342	1.284
POSITION	Other TC	2.168	3.942	9	-.862	5.198
GRP	M1 Base					
POSITION	Co Cadr	-.380	.000	1		
POSITION	Plt Ldrs	-.895	4.333	11	-3.806	2.017
POSITION	Other TC	-1.099	2.211	8	-2.947	.750
For entire sample		-.382	3.510	71	-1.213	.449

Time Demand: Task 12 - Identify/Prioritize Targets

Summaries of T12AVTD
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.0494	3.0690	71
GRP	1	IVC	-.4363	2.4567	27
GRP	2	CVC	.3867	3.9115	24
GRP	3	M1 Base	-.0502	2.7328	20

Total Cases = 91
Missing Cases = 20 OR 22.0 PCT.

Summaries of T12AVTD
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.0494	3.0690	71
POSITION	1	Co Cmdr	-.6383	4.2976	6
POSITION	2	Plt Ldrs	-.1033	3.1936	36
POSITION	3	Other TCs	.1395	2.7175	29

Total Cases = 91
Missing Cases = 20 OR 22.0 PCT.

Summaries of T12AVTD
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.0494	3.0690	71
GRP	1	IVC	-.4363	2.4567	27
POSITION	1	Co Cmdr	1.8183	1.2212	3
POSITION	2	Plt Ldrs	-1.1104	2.9992	12
POSITION	3	Other TCs	-.3258	1.7616	12
GRP	2	CVC	.3867	3.9115	24
POSITION	1	Co Cmdr	-3.8750	7.0357	2
POSITION	2	Plt Ldrs	.1985	3.4139	13
POSITION	3	Other TCs	1.6056	3.7481	9
GRP	3	M1 Base	-.0502	2.7328	20
POSITION	1	Co Cmdr	-1.5350	.0000	1
POSITION	2	Plt Ldrs	.6386	3.1425	11
POSITION	3	Other TCs	-.8119	2.1068	8

Total Cases = 91
Missing Cases = 20 OR 22.0 PCT.

Effort: Task 12 - Identify/Prioritize Targets

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	1033.32	62	16.67		
CONSTANT	21.14	1	21.14	1.27	.264
GRP(1)	48.75	1	48.75	2.93	.092
GRP(2)	.68	1	.68	.04	.841
POSITION	97.03	2	48.51	2.91	.062
GRP(1) BY POSITION	155.87	2	77.94	4.68	.013
GRP(2) BY POSITION	15.93	2	7.97	.48	.622

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	459.28	62	7.41		
SCENARIO	2.55	1	2.55	.34	.559
GRP(1) BY SCENARIO	5.85	1	5.85	.79	.378
GRP(2) BY SCENARIO	9.45	1	9.45	1.28	.263
POSITION BY SCENARIO	42.48	2	21.24	2.87	.064
GRP(1) BY POSITION BY SCENARIO	3.17	2	1.59	.21	.808
GRP(2) BY POSITION BY SCENARIO	12.87	2	6.43	.87	.425

Physical Demand: Task 12 - Identify/Prioritize Targets

Cell Means and Standard Deviations

Variable .. T12DFEF

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	1.323	1.810	3	-3.173	5.820
POSITION	Plt Ldrs	.801	2.403	12	-.726	2.328
POSITION	Other TC	.877	3.126	12	-1.109	2.864
GRP	CVC2					
POSITION	Co Cmdr	-7.410	3.762	2	-41.208	26.388
POSITION	Plt Ldrs	2.067	5.254	13	-1.108	5.242
POSITION	Other TC	1.100	3.780	9	-1.805	4.005
GRP	M1 Base					
POSITION	Co Cmdr	-2.940	.000	1		
POSITION	Plt Ldrs	1.547	2.466	11	-.110	3.204
POSITION	Other TC	-.655	1.293	8	-1.736	.426
For entire sample		.773	3.594	71	-.077	1.624

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Variable .. T12OFEF

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cmdr	2.097	2.467	3	-4.031	8.224
POSITION	Plt Ldrs	-1.407	3.018	12	-3.325	.510
POSITION	Other TC	.659	2.525	12	-.945	2.264
GRP	CVC2					
POSITION	Co Cmdr	-3.855	9.256	2	-87.017	79.307
POSITION	Plt Ldrs	.130	3.549	13	-2.015	2.275
POSITION	Other TC	1.556	5.711	9	-2.834	5.945
GRP	M1 Base					
POSITION	Co Cmdr	-5.630	.000	1		
POSITION	Plt Ldrs	-.133	2.616	11	-1.890	1.625
POSITION	Other TC	-.209	2.207	8	-2.054	1.636
For entire sample		-.049	3.603	71	-.902	.804

Effort: Task 12 - Identify/Prioritize Targets

Summaries of T12AVEF
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3622	3.0347	71
GRP	1	IVC2	.3967	2.0143	27
GRP	2	CVC2	.6235	4.4924	24
GRP	3	M1 Base	.0020	1.9294	20

Total Cases = 91
Missing Cases = 20 OR 22.0 PCT.

Summaries of T12AVEF
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3622	3.0347	71
POSITION	1	Co Cadr	-1.7367	4.8960	6
POSITION	2	Plt Ldrs	.5117	2.7985	36
POSITION	3	Other TCs	.6109	2.8138	29

Total Cases = 91
Missing Cases = 20 OR 22.0 PCT.

Summaries of T12AVEF
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3622	3.0347	71
GRP	1	IVC2	.3967	2.0143	27
POSITION	1	Co Cadr	1.7100	1.5811	3
POSITION	2	Plt Ldrs	-.3033	1.4519	12
POSITION	3	Other TCs	.7683	2.4232	12
GRP	2	CVC2	.6235	4.4924	24
POSITION	1	Co Cadr	-5.6325	6.5089	2
POSITION	2	Plt Ldrs	1.0985	4.1930	13
POSITION	3	Other TCs	1.3278	3.9555	9
GRP	3	M1 Base	.0020	1.9294	20
POSITION	1	Co Cadr	-4.2850	.0000	1
POSITION	2	Plt Ldrs	.7073	1.6454	11
POSITION	3	Other TCs	-.4319	1.6170	8

Total Cases = 91
Missing Cases = 20 OR 22.0 PCT.

Frustration: Task 12 - Identify/Prioritize Targets

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	969.32	62	15.63		
CONSTANT	34.34	1	34.34	2.20	.143
GRP(1)	.48	1	.48	.03	.861
GRP(2)	.04	1	.04	.00	.959
POSITION	30.31	2	15.16	.97	.385
GRP(1) BY POSITION	111.34	2	55.67	3.56	.034
GRP(2) BY POSITION	41.38	2	20.69	1.32	.274

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	359.57	62	5.80		
SCENARIO	26.90	1	26.90	4.64	.035
GRP(1) BY SCENARIO	2.03	1	2.03	.35	.556
GRP(2) BY SCENARIO	9.74	1	9.74	1.68	.200
POSITION BY SCENARIO	1.40	2	.70	.12	.887
GRP(1) BY POSITION B Y SCENARIO	3.55	2	1.78	.31	.737
GRP(2) BY POSITION B Y SCENARIO	18.63	2	9.31	1.61	.209

Cell Means and Standard Deviations
Variable .. T12DFFR

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-.280	2.299	3	-5.990	5.430
POSITION	Plt Ldrs	-1.178	3.301	12	-3.275	.919
POSITION	Other TC	1.352	3.474	12	-.854	3.559
GRP	CVC2					
POSITION	Co Cadr	-4.575	4.236	2	-42.630	33.480
POSITION	Plt Ldrs	1.737	4.006	13	-.684	4.158
POSITION	Other TC	1.098	3.856	9	-1.866	4.062
GRP	M1 Base					
POSITION	Co Cadr	1.560	.000	1		
POSITION	Plt Ldrs	.785	2.317	11	-.771	2.342
POSITION	Other TC	-1.237	1.990	8	-2.901	.426
For entire sample		.350	3.418	71	-.459	1.159

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Variable .. T12DFFR

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	.160	.940	3	-2.174	2.494
POSITION	Plt Ldrs	-2.557	2.720	12	-4.286	-.829
POSITION	Other TC	-.933	2.659	12	-2.623	.756
GRP	CVC2					
POSITION	Co Cadr	-3.795	5.282	2	-51.253	43.663
POSITION	Plt Ldrs	.508	4.637	13	-2.294	3.310
POSITION	Other TC	.518	3.086	9	-1.854	2.890
GRP	M1 Base					
POSITION	Co Cadr	-4.440	.000	1		
POSITION	Plt Ldrs	.574	3.031	11	-1.463	2.610
POSITION	Other TC	-2.145	2.389	8	-4.143	-.147
For entire sample		-.747	3.379	71	-1.546	.053

Summaries of T12AVFR
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.1983	2.9559	71
GRP	1	IVC2	-.7437	2.5228	27
GRP	2	CVC2	.5623	3.7717	24
GRP	3	H1 Base	-.3748	2.2525	20

Total Cases = 91
Missing Cases = 20 OR 22.0 PCT.

Summaries of T12AVFR
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.1983	2.9559	71
POSITION	1	Co Cadr	-1.6650	2.9794	6
POSITION	2	Plt Ldrs	-.0096	3.2185	36
POSITION	3	Other TCs	-.1291	2.6073	29

Total Cases = 91
Missing Cases = 20 OR 22.0 PCT.

Summaries of T12AVFR
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-.1983	2.9559	71
GRP	1	IVC2	-.7437	2.5228	27
POSITION	1	Co Cadr	-.0600	.7927	3
POSITION	2	Plt Ldrs	-1.8679	2.5671	12
POSITION	3	Other TCs	.2096	2.4168	12
GRP	2	CVC2	.5623	3.7717	24
POSITION	1	Co Cadr	-4.1850	4.7588	2
POSITION	2	Plt Ldrs	1.1227	3.9035	13
POSITION	3	Other TCs	.8078	3.0000	9
GRP	3	H1 Base	-.3748	2.2525	20
POSITION	1	Co Cadr	-1.4400	.0000	1
POSITION	2	Plt Ldrs	.6795	2.0948	11
POSITION	3	Other TCs	-1.6913	1.9007	8

Total Cases = 91
Missing Cases = 20 OR 22.0 PCT.

Appendix H3
Hand-off Target to Gunner

Variable or term	Description
GRP(1)	ANOVA factor comparing CVCC with M1 Baseline
GRP(2)	ANOVA factor comparing CVCC with IVCC
T13DFDVN	Total workload deviation score for defensive scenario
T13OFDVN	Total workload deviation score for offensive scenario
TSK13DVN	Total workload deviation score-mean across scenarios

Deviation Scores: Task 13 - Hand-off Target to Gunner

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	15005.74	61	246.00		
CONSTANT	8483.01	1	8483.01	34.48	.000
GRP(1)	522.61	1	522.61	2.12	.150
GRP(2)	252.33	1	252.33	1.03	.315
POSITION	310.39	2	155.20	.63	.536
GRP(1) BY POSITION	613.26	2	306.63	1.25	.295
GRP(2) BY POSITION	507.05	2	253.52	1.03	.363

Tests involving 'SCENARIO' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	3920.15	61	64.26		
SCENARIO	3.66	1	3.66	.06	.812
GRP(1) BY SCENARIO	.43	1	.43	.01	.935
GRP(2) BY SCENARIO	31.42	1	31.42	.49	.487
POSITION BY SCENARIO	70.79	2	35.40	.55	.579
GRP(1) BY POSITION BY SCENARIO	110.59	2	55.29	.86	.428
GRP(2) BY POSITION BY SCENARIO	154.13	2	77.07	1.20	.308

Cell Means and Standard Deviations
Variable .. T13DFDVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-21.098	7.634	3	-40.061	-2.135
POSITION	Plt Ldrs	-9.478	11.290	10	-17.554	-1.401
POSITION	Other TC	-11.923	11.960	12	-19.523	-4.324
GRP	CVC2					
POSITION	Co Cadr	-5.526	10.099	2	-96.261	85.210
POSITION	Plt Ldrs	-14.313	15.000	12	-23.844	-4.782
POSITION	Other TC	-5.580	8.638	12	-11.068	-.092
GRP	M1 Base					
POSITION	Co Cadr	-15.313	.000	1		
POSITION	Plt Ldrs	-7.082	19.231	11	-20.002	5.837
POSITION	Other TC	-13.044	5.824	7	-18.431	-7.658
For entire sample		-10.506	12.752	70	-13.547	-7.466

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Variable .. T13DFDVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-21.381	10.664	3	-47.872	5.110
POSITION	Plt Ldrs	-9.493	11.054	10	-17.400	-1.585
POSITION	Other TC	-7.252	10.158	12	-13.706	-.798
GRP	CVC2					
POSITION	Co Cadr	-8.460	32.913	2	-304.171	287.250
POSITION	Plt Ldrs	-8.302	14.332	12	-17.408	.805
POSITION	Other TC	-3.275	8.027	12	-8.375	1.825
GRP	M1 Base					
POSITION	Co Cadr	-16.938	.000	1		
POSITION	Plt Ldrs	-12.362	14.143	11	-21.863	-2.860
POSITION	Other TC	-11.686	6.765	7	-17.943	-5.430
For entire sample		-9.095	11.993	70	-11.955	-6.236

Deviation Scores: Task 13 - Hand-off Target to Gunner

Summaries of TSK13DVN
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-9.8008	11.0155	70
GRP	1	IVC2	-10.9449	10.6523	25
GRP	2	CVC2	-7.8002	10.3942	26
GRP	3	M1 Base	-11.0329	12.4334	19

Total Cases = 91
Missing Cases = 21 OR 23.1 PCT.

Summaries of TSK13DVN
By levels of GRP
POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-9.8008	11.0155	70
GRP	1	IVC2	-10.9449	10.6523	25
POSITION	1	Co Cmdr	-21.2395	9.1059	3
POSITION	2	Plt Ldrs	-9.4851	10.6984	10
POSITION	3	Other TCs	-9.5878	10.2958	12
GRP	2	CVC2	-7.8002	10.3942	26
POSITION	1	Co Cmdr	-6.9931	11.4070	2
POSITION	2	Plt Ldrs	-11.3075	13.5500	12
POSITION	3	Other TCs	-4.4274	4.9157	12
GRP	3	M1 Base	-11.0329	12.4334	19
POSITION	1	Co Cmdr	-16.1250	.0000	1
POSITION	2	Plt Ldrs	-9.7221	15.8820	11
POSITION	3	Other TCs	-12.3654	5.8162	7

Total Cases = 91
Missing Cases = 21 OR 23.1 PCT.

Appendix H4
Coordinate Platoon Fires

Variable or term	Description
GRP(1)	ANOVA factor comparing CVCC with M1 Baseline
GRP(2)	ANOVA factor comparing CVCC with IVCC
T15OFDVN and T15DFDVN	Not tested because of low n
TSK15DVN	Total workload deviation score-mean across scenarios

Deviation Scores: Task 15 - Coordinate Platoon Fires

* * * * * ANALYSIS OF VARIANCE -- DESIGN 1 * * * * *

Tests of Significance for T15DVN using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	2455.29	22	111.60		
CONSTANT	878.14	1	878.14	7.87	.010
GRP(1)	61.06	1	61.06	.55	.467
GRP(2)	1.16	1	1.16	.01	.920
POSITION	3.04	1	3.04	.03	.870
GRP(1) BY POSITION	140.38	1	140.38	1.26	.274
GRP(2) BY POSITION	283.30	1	283.30	2.54	.125

Cell Means and Standard Deviations
Variable .. T15DVN

FACTOR	CODE	Mean	Std. Dev.	N	95 percent Conf. Interval	
GRP	IVC2					
POSITION	Co Cadr	-5.906	5.664	3	-19.977	8.165
POSITION	Plt Ldrs	-4.002	11.219	11	-11.539	3.535
GRP	CVC2					
POSITION	Co Cadr	-3.644	6.292	3	-19.274	11.986
POSITION	Plt Ldrs	-15.027	30.576	2	-289.740	259.686
GRP	M1 Base					
POSITION	Co Cadr	-14.667	.000	1		
POSITION	Plt Ldrs	-2.495	4.112	8	-5.933	.943
For entire sample		-4.906	10.217	28	-8.867	-.944

Deviation Scores: Task 15 - Coordinate Platoon Fires

Summaries of T15DVN
By levels of GRP

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-4.4981	9.4602	35
GRP	1	IVC2	-4.2698	9.4855	16
GRP	2	CVC2	-5.3299	15.1026	7
GRP	3	M1 Base	-4.3172	5.3820	12

Total Cases = 35

Summaries of T15DVN
By levels of POSITION

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			-4.4981	9.4602	35
POSITION	1	Co Cmdr	-6.1882	6.2568	7
POSITION	2	Plt Ldrs	-4.4780	11.3323	21
POSITION	3	Other TCs	-2.8681	5.7869	7

Total Cases = 35